Carpentry NTQF Level II

Learning Guide #68

Unit of Competence: **Install and Replace Windows and Doors**

Module Title: **Installing and Replacing Windows and Doors**

LG Code: **EIS CRP2 M14 LO5-LG-68**

TTLM Code: **EIS CRP2 M14 TTLM 0919v1**

LO5: Install door and door unit

Instruction Sheet	Learning Guide #68

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics.

- Positioning Door unit in place and finishing
- Fitting Door to jamb
- marking out Hinges on door and jamb
- Fitting Hinges to door and jamb
- making Final adjustments of door
- fitting and fixing Door component

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- Position Door unit in place and finishing
- Fit Door to jamb
- mark out Hinges on door and jamb
- Fit Hinges to door and jamb
- make Final adjustments of door
- fit and fix Door component

Learning instruction

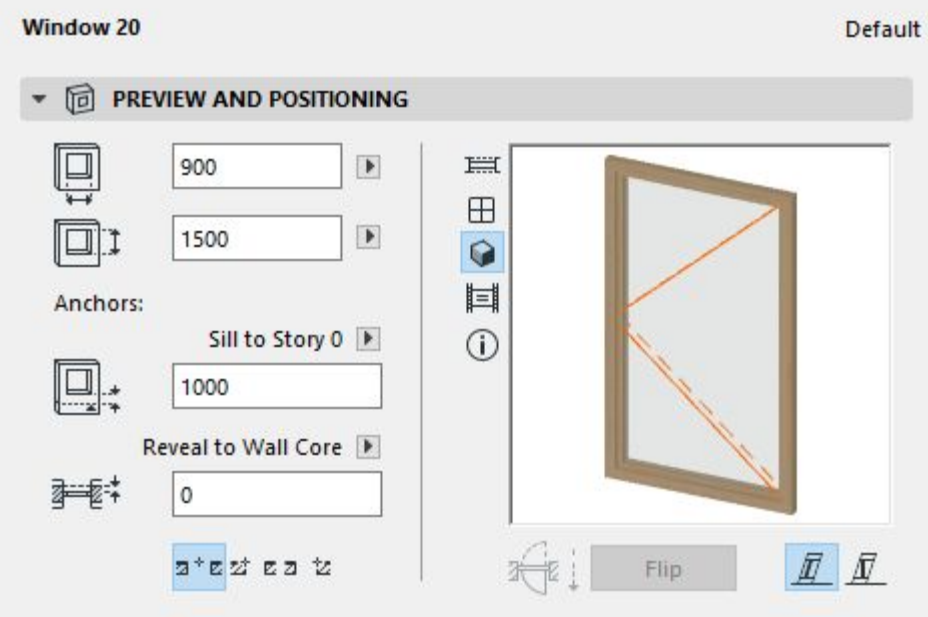
- ✓ Read the specific objectives of this Learning Guide.
- ✓ Read the information written in the “Information Sheets 1”. Try to understand and familiarize what are being shown and discussed. Ask your teacher for assistance if you have hard time understanding them.
- ✓ Accomplished and submit “Self-checks 1” for evaluation.
- ✓ If you earned a satisfactory evaluation for "self-check 1" then proceed to “Operation Sheet 1”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 1.
- ✓ Read the “Operation Sheet 1” and try to understand the procedures discussed.
- ✓ Accomplish and submit “Operation Sheet 1” for evaluation.
- ✓ If you earned a satisfactory evaluation for one "Operation Sheet 1" then proceed to the next “Information Sheet”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Operation Sheet where you get unsatisfactory evaluation.
- ✓ Continue to the next “Information Sheet” and follow instruction for learning activities in “2-7”.
- ✓ After all “Self Check” and “Operation Sheet” is accomplished and evaluated proceed to “LAP Test”.

- ➢ Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to the next topic.

Information Sheet 24	Positioning Door unit in place and finishing

24.1 Positioning Door unit in place and finishing

✓ Door/Window Preview and Positioning Panel

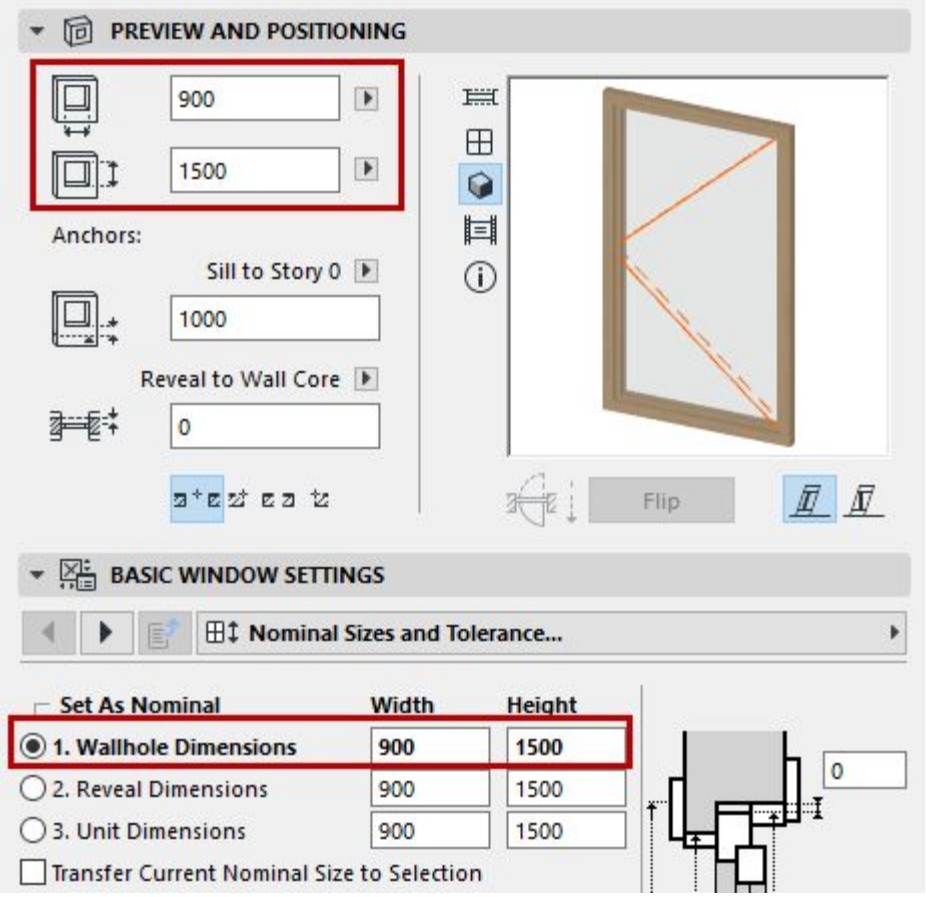


Use the fields to enter the following values for the Door/Window:

Width: Enter Width of the opening here.

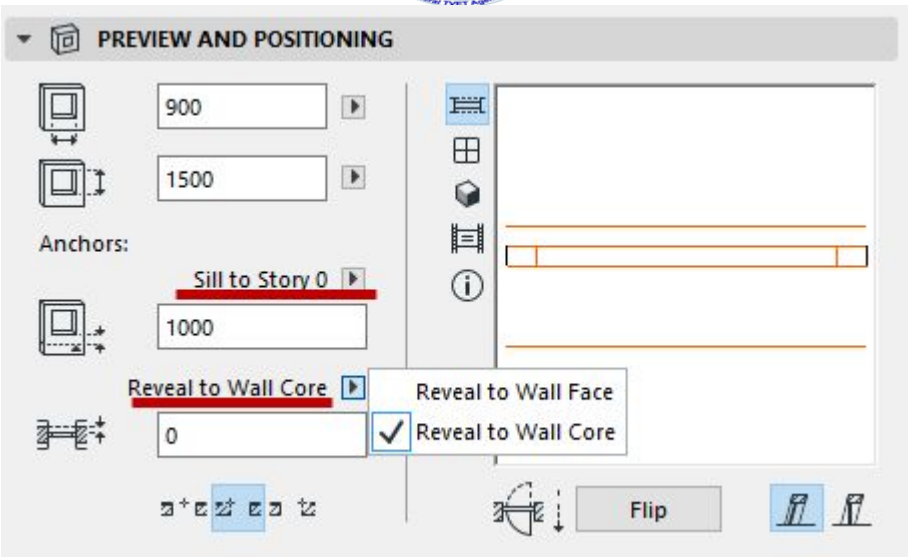
Height: Enter Height of the opening here.

Note: These Width/Height values are the window's **Nominal Size** values, which can also be entered in the Graphical Interface Panel's Nominal Sizes and Tolerance panel.



Sill/Header Value: Enter the height of the Door or Window Sill or Header from the chosen reference point.

Define the reference point for the sill/header by choosing from the pop-up above the value field:



See also Sill or Header Heights.

Reveal: Enter the depth of the Door/Window Reveal, if any.

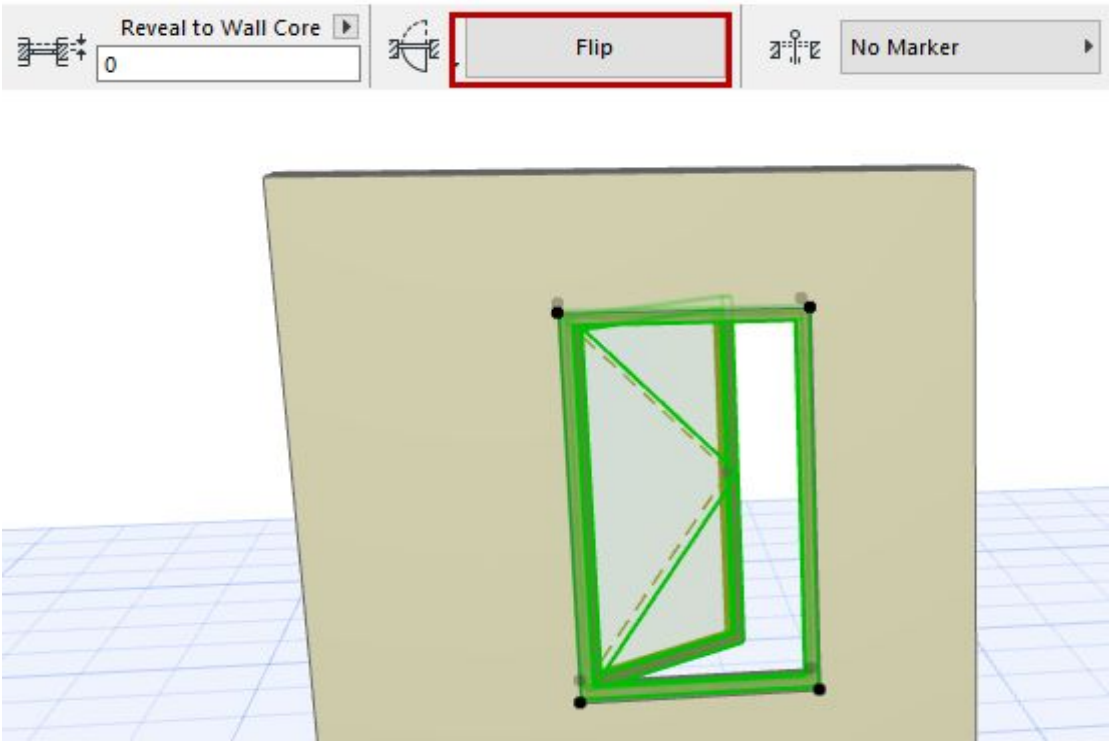
Anchor the Reveal to either the Wall face or the Wall core (the closest core skin, if there are several core skins). This is relevant if you are using a composite Wall.

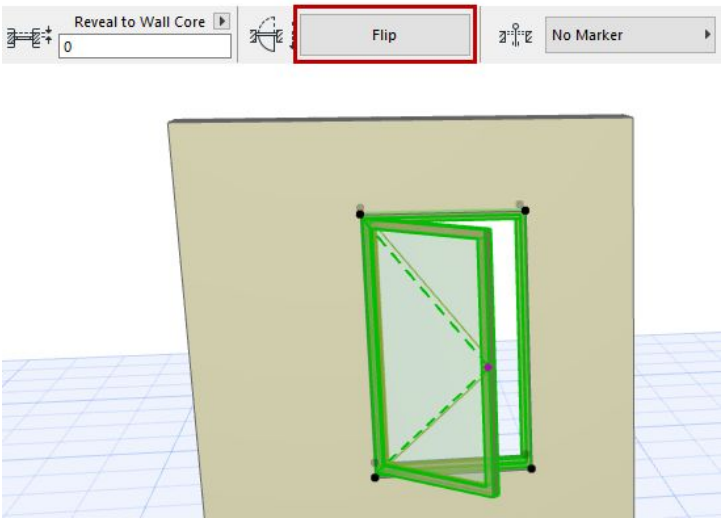
See also Anchor Reveal.

> **Note:** The Reveal value, on the Preview and Positioning Panel, is the *same* as the Reveal Depth value on the **Reveal** tab page of the Custom Settings panel of Door/Window Settings.

Preview Area

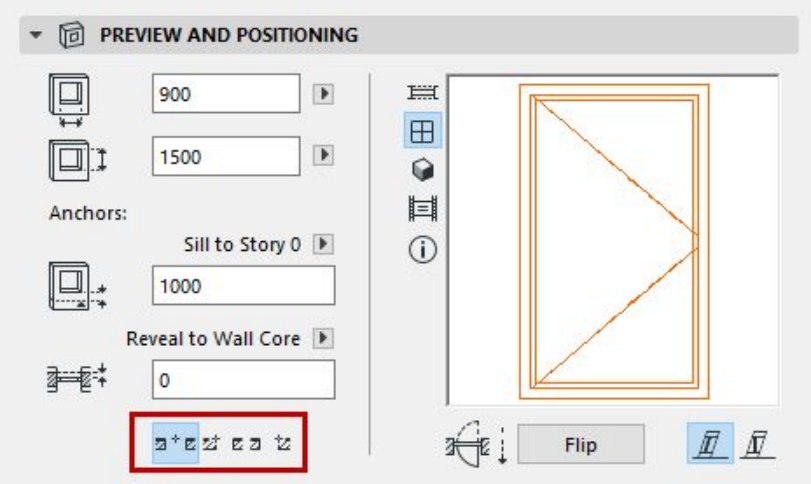
The **Flip** button switches the opening direction of a selected door/window from one side to the other, while keeping the frame in place. (This button is also available in the Info Box).





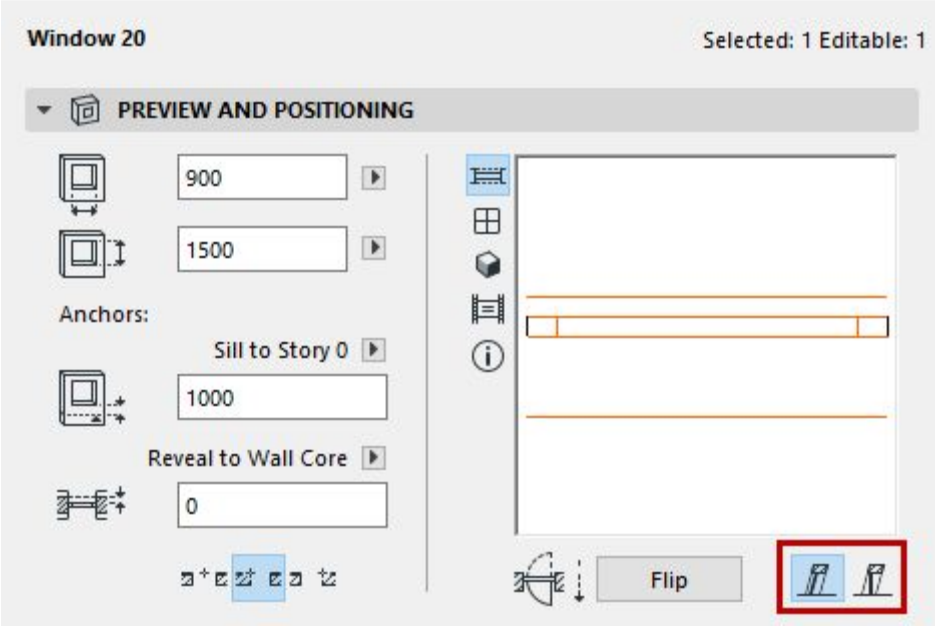
Anchor Point: This control affects the method used to place a new Window/Door. Choose either side or the Center as your preferred geometry method for placing the Door/Window.

As you place the opening into a Wall, you can switch Geometry Methods on the fly (use the Anchor Point control in the Info Box, or its shortcut.)



See also Placing Doors or Windows.

Opening Plane: This control is relevant if your door/window is placed into a slanted wall.



•Associated to Wall: The plane of the door/window will follow the plane of the wall.

•Vertical: The door/window will be placed vertically regardless of the plane of the wall it is placed into.

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. --------is control affects the method used to place a new Window/Door. Choose either side or the Center as your preferred geometry method for placing the Door/Window
   A. Anchor point
   B. Window unit
   C. None
   D. All

Note: **Satisfactory above – 4 out of 8 points Unsatisfactory - below 4 out of 8 point**

Information Sheet 25	Fitting Door to jamb

25.1 Fitting Door to jamb

Door jamb (also sometimes doorpost) is the vertical portion of the **door** frame onto which a **door** is secured

✓ How to Install a Door Jamb

Part 1

Cutting the Jamb Pieces

- ✓ **Measure the width of the door frame.** Break out the tape measure. You'll need to know how wide your door frame is so the jamb fits in it. Hold the tape measure up to the top of the door frame. Note the measurement and save it for later.

Keep in mind that if the door has 2x4 walls, then the frame will be 4-1/2" (11.4 cm). If the door has 2x6 walls, then the frame will always be 6-1/2" (16.5 cm).

Measure the sides of the door frame. Take your tape measure to one side of the door frame. Note the length and mark this on one piece of wood. If you have level ground, this measurement will be the same for the other side. Most likely they'll be different, so measure the other side of the frame and mark its length on another piece of wood. Don't forget to also measure the top part of the frame for the smaller piece of wood.

Cut the wood. Suit up with safety gear, including gloves, safety glasses, and a visor, before turning on your circular saw. Thin the pieces of wood so they fit within the frame. Follow up by cutting their length according to the measurements you took earlier.

Part2

Creating and Installing the Jamb

- ✓ **Nail the wood together.** Lay one of the longer pieces of wood on its side and add a bit of wood glue to the end. Attach the shorter piece to one end of the longer piece. Get your nail gun and hold it square on the outside of the area where the wood meets. Add the nails to secure the pieces together. Align the other piece of wood on the opposite side and attach it the same way.

- ✓ **Hold the jamb up to the door frame.** Carefully move your newly-cut wood up into the frame. Since you measured, it should fit in there well. Align the left side against the wall and see if it appears level. Double-check this with a level.

- ✓ **Level out the jamb with wood strips.** After attaching the jamb to the frame, place wood strips (shims) under it. Make sure that you do not lift the jamb too much. Figure out where you need to place the shims to level the hinge side from top to bottom. Get these strips from the home improvement store. Slip them between the jamb and frame as needed.[4]

- Always start with the side where the door will attach to the hinges.
- Make sure to fasten the hinge side jambs directly to the stud. You can fasten them loosely in case you need to slide a jamb behind it, but it is best to keep it tight.

- ✓ **Hold the door against the jamb to check for clearance.** You can hold the jamb in place by lightly hammering in a few nails. Place the door inside the jamb. The door needs to fit comfortably inside the jamb. Look for the gap between the door and jamb to be one-eighth of an inch (.32 cm) on all sides. Add or remove shimming so the door fits. When you're sure the measurements are correct, remove the door.

- ✓ **Nail the hinge side of the jamb to the frame.** Get your nail gun again. Make sure the jamb is even against the wall and frame. Begin securing it with nails from top to bottom. Be sure to put a nail through each shim to hold them in place.

Weather strips are a good way of hiding screw marks. Screws make exterior doors stronger and more adjustable. Drill a hole in the jamb before adding the screws, then attach the weather strips over them.

- ✓ **Secure the other sides of the jamb to the frame.** Move onto the top side. First, hold your level up to the jamb. If it doesn't appear level, add some shims to even it out. Finish by nailing the jamb to the frame. Repeat this with the side opposite the hinges.[8]

- ✓ **Cut the shims to size with a utility knife.** The shims will have their ends sticking out of the jamb. Go ahead and take your utility knife or other woodcarving knife and score them, then use your hammer to break off the ends.

Installing Door Stops

- ✓ **Hang the door in the jamb.** Screw the hinges onto the correct side of the jamb. Unless you are installing a prehung door, you'll need to trace the outline of the hinges on the jamb and cut an indentation using a router or utility knife. Place the door in the jamb and fasten it to the hinges. Make sure it's tight and opening in the right direction.

It's ideal to do this first so you can gauge how much space you have for the door stops and align them properly behind the hinges.

- ✓ **Measure out the stopper width.** The door stopper (also called stop molding) can be bought pre-cut or fashioned out of wood strips. You will need to measure out how wide the stopper needs to be so that the pieces on each side of the door frame fit together. The moulding goes behind the hinges and rests in the middle of the jamb. Measure it against the jamb until you're sure it's the right thickness.

The stop molding is thin. When cutting it yourself, you only need strips of wood about one or two inches (two to five cm) wide.

- ✓ **Measure the stopper's length on the door jamb.** Start with the top part. Measure all the way across the jamb so that the stopper will go all the way across the jamb. Now measure the amount of wood needed from top to bottom of both the left and right sides of the jamb.

- ✓ **Cut your stopper wood down to size.** Use a saw to trim the wood to the required length. You'll have a shorter piece for the top of the door and two longer pieces for the sides.

- ✓ **Nail the stopper to the door frame.** Get your nail gun one more time. Start with the top side. Keep the stopper pieces even and centered in the jamb. Nail the shorter piece to the frame. Nail the other pieces to the sides. When you're done, the closed door should rest inside the jamb.

Figure 1 door stops

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the steps of creating and installing jamb

Note: **Satisfactory above – 4 out of 8 points Unsatisfactory - below 4 out of 8 point**

Information Sheet 26	marking out Hinges on door and jamb

26.1 marking out Hinges on door and jamb

Hinge jamb. The door

jamb to which **hinges** are attached.

- ✓ How do you put hinges on a door jamb?

Steps

1. Place your hinges in the correct location. Assuming you're installing a new door, you'll need to find the precise location on the door frame for your hinges. ...
2. Trace around the hinge. ...
3. Cut the mortise. ...
4. Mark the location of the screws. ...
5. Drill the pilot holes. ...
6. Install the individual hinges. ...
7. Connect the door to the jamb.

- ✓ How do you cut a door jamb for hinges?

To cut hinge mortises on a door:

i. Screw the hinge to the door or jamb.

ii. Score around the outline of the hinge with a utility knife.

iii. Remove the hinge from the door or jamb.

iv. Position the chisel on the scored line with the chisel perpendicular to the door or jamb and the bevel side of the chisel facing toward the mortise

Figure 2 hinges

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. How do you cut a door jamb for hinges?

Note: **Satisfactory above – 4 out of 8 points Unsatisfactory - below 4 out of 8 point**

Information Sheet 27	Fitting Hinges to door and jamb

27.1 Fitting Hinges to door and jamb

Installation Instructions

The easiest way to **install** new **door hinges** is to leave the **door** in place throughout the process. There's no need to remove the **door** if **you** replace **hinges** one at a time. **First**, **you**'ll need to remove the screws on both leaves of the existing **hinge**.

- ✓ How do you put hinges on a door jamb?

Steps

I. Place your hinges in the correct location. Assuming you're installing a new door, you'll need to find the precise location on the door frame for your hinges. ...
II. Trace around the hinge. ...
III. Cut the mortise. ...
IV. Mark the location of the screws. ...
V. Drill the pilot holes. ...
VI. Install the individual hinges. ...
VII. Connect the door to the jamb.

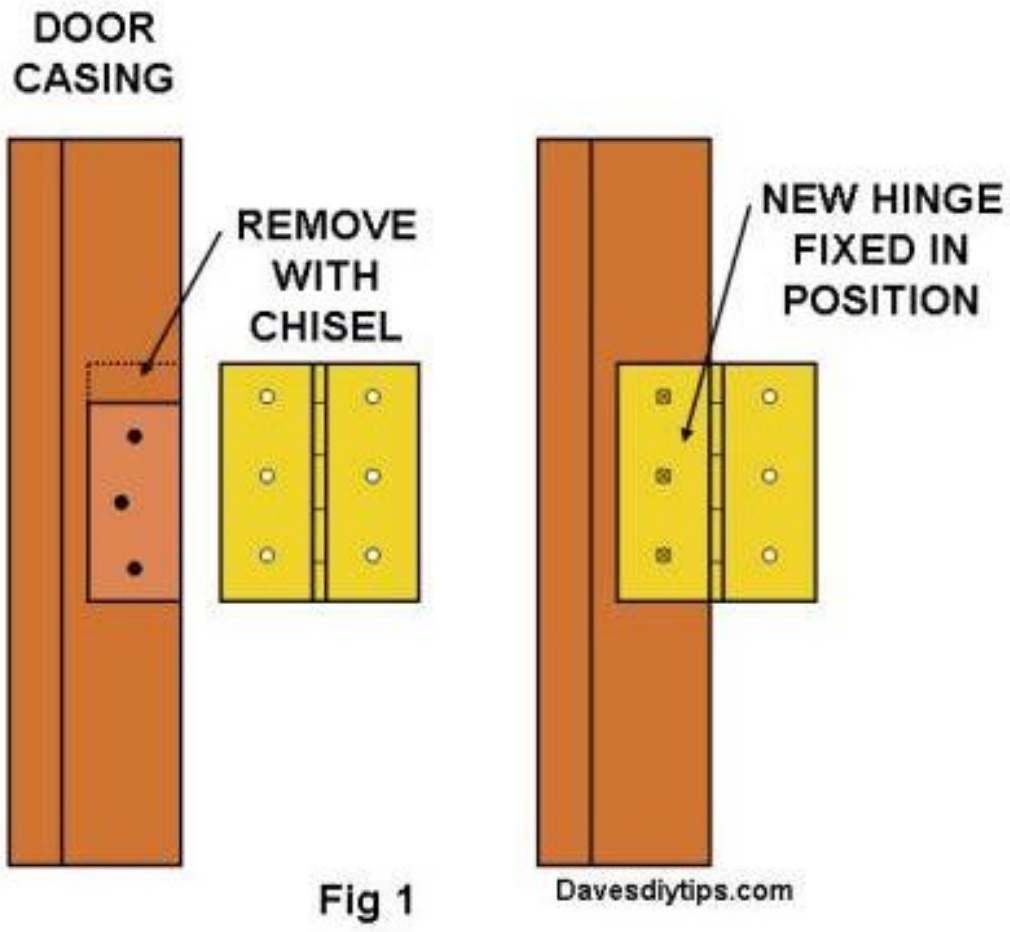


Figure 3 installation of hinges

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. How do you put hinges on a door jamb? Write the steps

Note: **Satisfactory above – 4 out of 8 points Unsatisfactory - below 4 out of 8 point**

Information Sheet 28	making Final adjustments of door

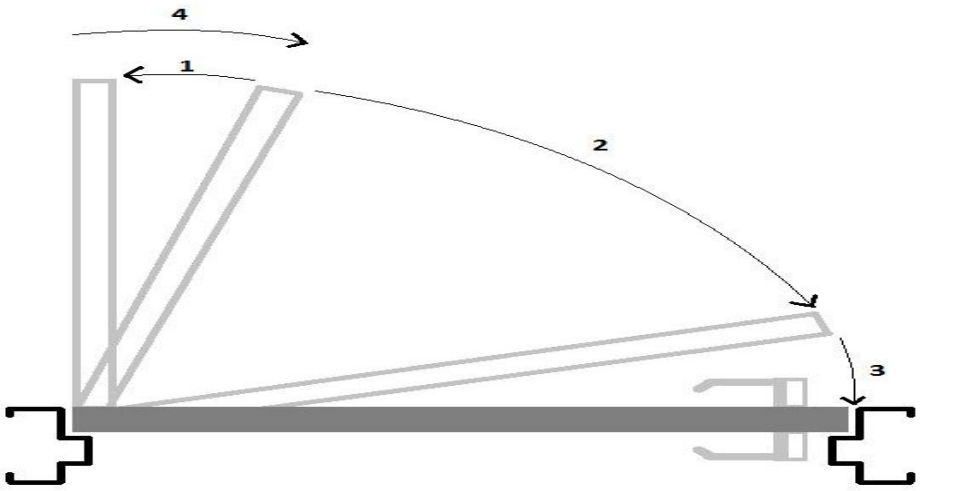
28.1 making Final adjustments of door

- ✓ **How To Make Door Closer Adjustments**

Most door closers come from the factory pre-adjusted to the most common settings, according to what was ordered. Once the closer is installed some additional adjustments may be required to function properly at the opening. In this post we'll look at some common adjustments that can be made on the door closer that will help ensure the door closes properly.

Door Closer Control Zones

Here is a diagram showing the basic control zones that can be controlled using a door closer.

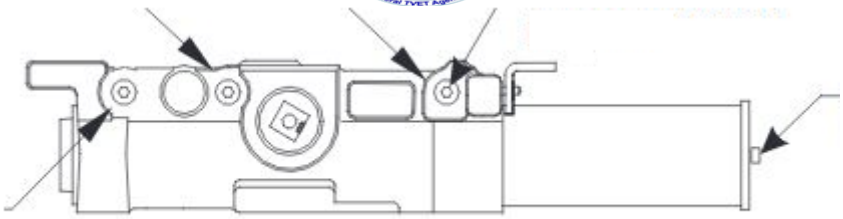


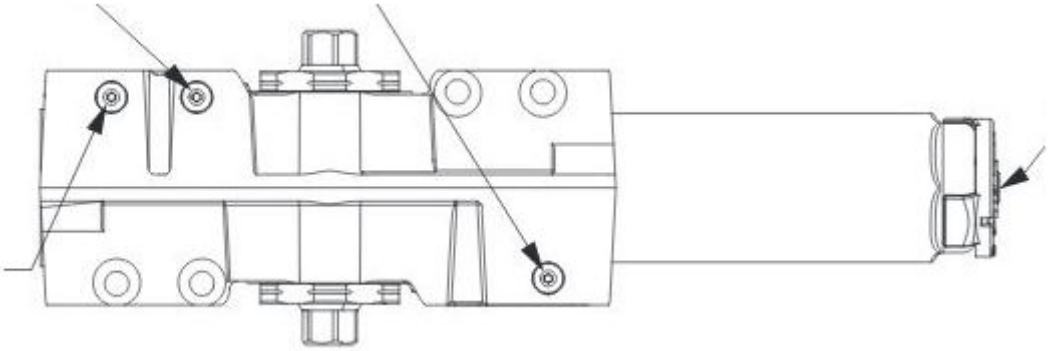
1. Opening Swing: **Back Check**
2. Closing Swing: **Main Speed**
3. Closing Swing: **Latch Speed**
4. Optional on Some Closers during Closing Swing: **Delayed Action**

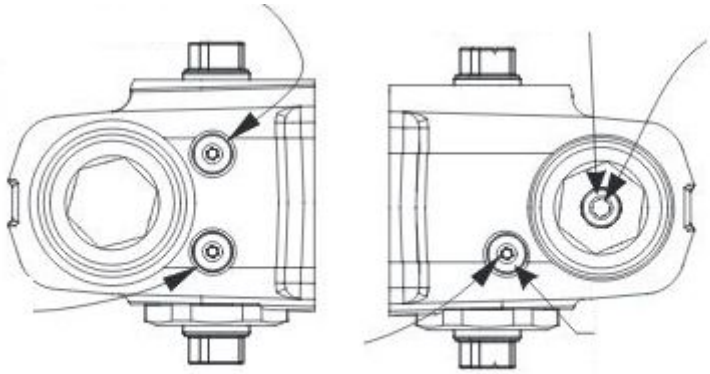
The closer adjustments that we'll talk about will not include the delayed action control zone. Delayed action is optional on some door closers when ordering but is generally not included.

- ✓ **Door Closer Adjustment Valves**

Depending on the type of door closer that you have installed, the closer adjustment valves will be located in different locations on the door closer body. The adjustment valves are usually located in an accessible location so that the door closer can be adjusted after it has already been installed. Here are a few examples:





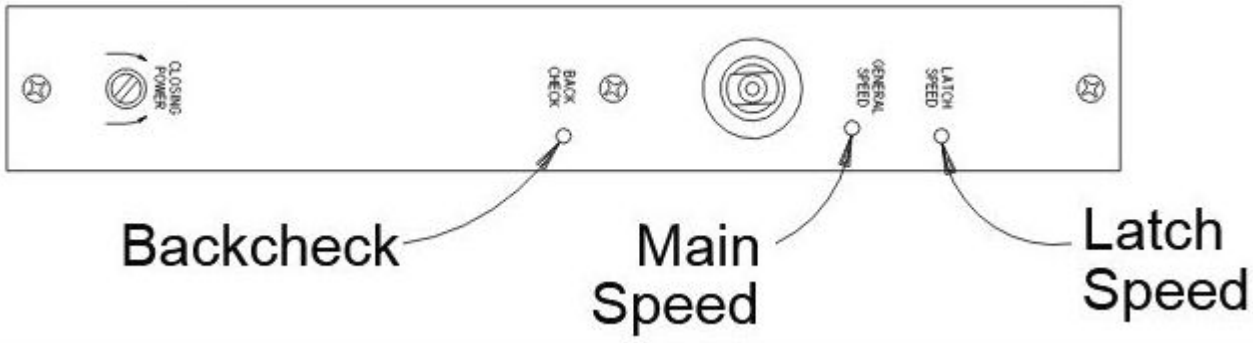


Side View

Side View

As you can see, there are some door closer bodies with the valves on the top, on the front, or on the sides of the closer body. A hex screw wrench or sometimes a screwdriver is needed to turn the adjustment valves. Be sure to check the closer instructions for what is needed to make the adjustments.

Concealed closers often have adjustment screws visible even though the closer body is concealed in the frame, door, or in the floor.



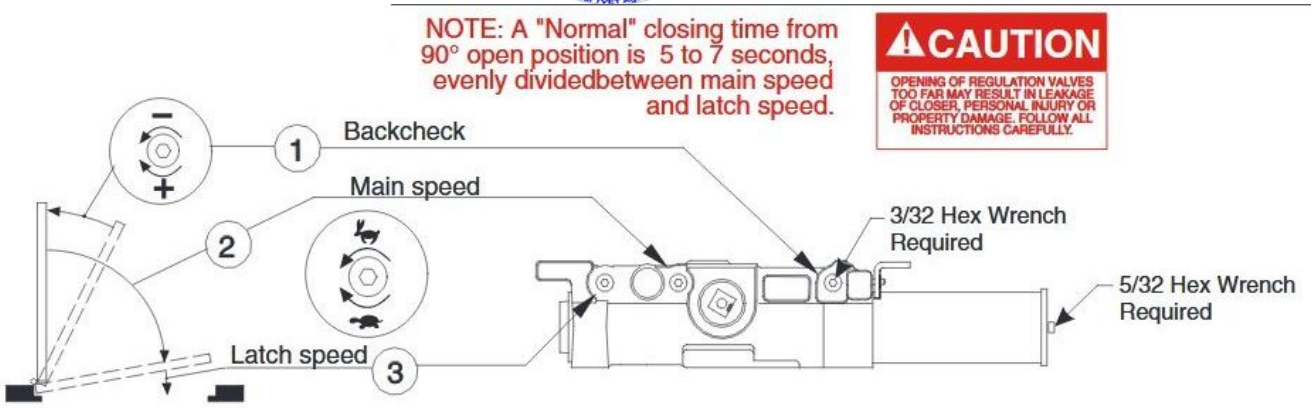
Concealed Closer

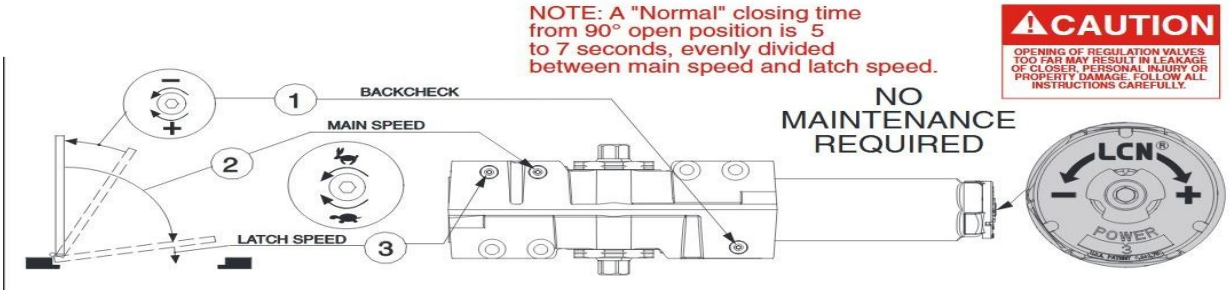
- ✓ **Making Door Closer Adjustments**

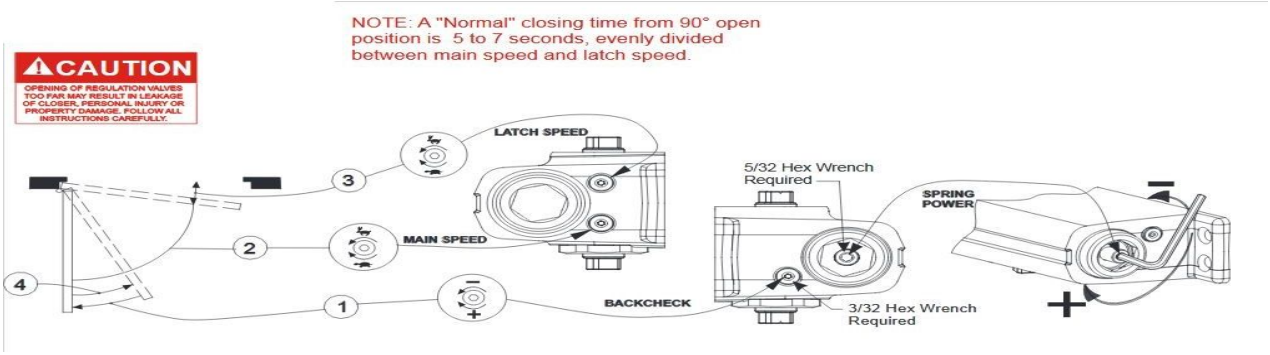
Once you have located the valves, you need to make sure you are adjusting the correct valve and turning it in the correct direction.

Caution! Opening of regulation valves too far may result in leakage of closer, personal injury or property damage. Follow all instructions provided with the closer carefully.

Tightening the valves will usually decrease the speed of each control zone while loosening the valves will increase the speed of each control zone. Tightening the spring power will increase the overall speed of the door closer and loosening will decrease the overall speed of the closer. Generally a clockwise rotation of the valve will tighten it and a counter-clockwise turn will loosen it.







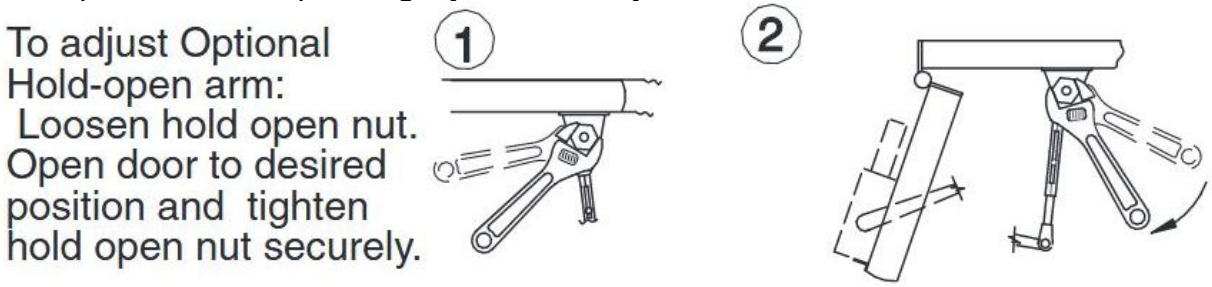
The adjustments will often not require very much turning to make significant changes in the control zone speeds.

Do not turn the valves excessively when making adjustments. Even small quarter turns of a valve can make a lot of difference. If a valve is loosened too much, it can cause the door closer to leak and not function properly. This will likely require replacement of

the closer body. If you have inappropriately adjusted the door closer valves it will not be warranted by the factory.

- ✓ **Hold Open Nut Adjustments**

When a door closer has a hold open arm with a friction nut operation, the door closer can be adjusted to hold open at a degree of opening determined by the installer. 90 degrees is commonly the default hold open setting when shipped from the factory. To adjust the hold open nut, loosen the nut and then open the door to the desired hold open position. This is where you will tighten the hold open nut securely. Some styles of hold open arm will require slightly different adjustments.



It is important to follow the instructions included with the door closer you have installed.

Figure 4 adjustment screw

Self-Check -5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. How to Make Door Closer Adjustments?

Note: **Satisfactory above – 4 out of 8 points Unsatisfactory - below 4 out of 8 point**

Information Sheet 29	fitting and fixing Door component

29.1 fitting and fixing Door component

- ✓ **Fitting a door lining**

Fitting a door lining is a job that is required if you are replacing an old door lining, or you've built a new wall with a doorway, and therefore need to create a perfectly 'square' wooden frame onto which you then hang your new door. For more information on openings for doors, the anatomy of a doorway and frame, and measuring up for a new door lining, see my guide – 'Interior door frames'. The sequence below shows how to assemble a door lining kit, and how to fit it into the opening in a wall.

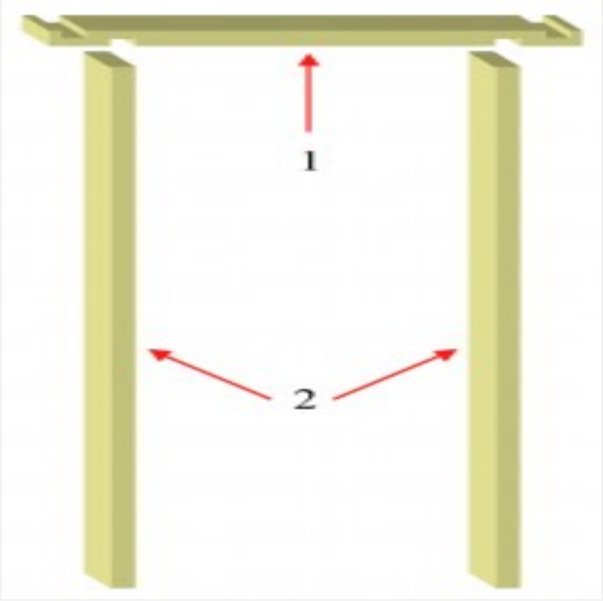


Figure 5 parts of door lining kit

Door lining kits are supplied in three sections (they may also come with three lengths of door stop, but you don't need those until later on, after the door is hung). The components of the lining are shown in Fig. 1.

1. The head section, which goes at the top.

2. The two side sections, often called legs or jambs.

The head will generally have machined grooves, into which the door lining legs or jambs are fitted. The head is often reversible, as shown in the picture, as one lining kit is then able to fit two different sizes of door. You simply choose which way up you use the head, according to your door size.

It should be a tight fit when you insert each leg into the head. Usually a tap with a wooden mallet, or the butt end of your hammer is all that is required to knock the legs into place.

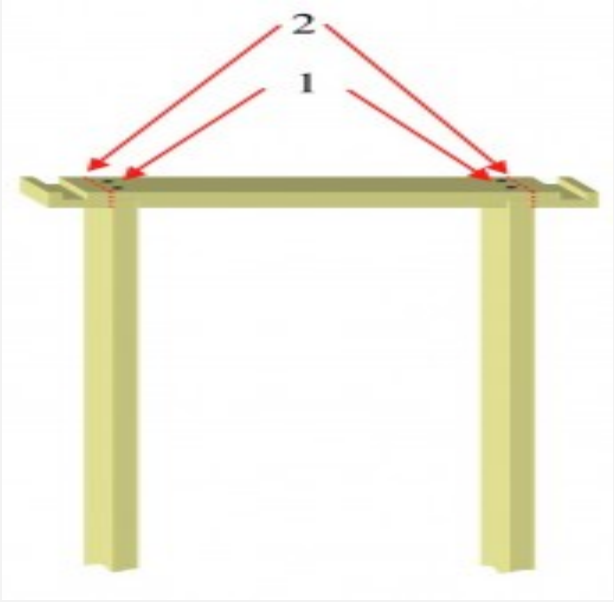


Figure 6 screwing the lining together.....

Fig. 2. – Screwing the lining together and cutting off the ‘horns’.

You still need physical fixings to hold the head in place and this is shown in Fig. 2.

1. Use two to three fixings to screw down through the top of the head into the legs (80mm screws are fine for this). Take great care to insert the screws dead straight as the lining legs are not particularly wide. You also need to ensure that the joint between the head and both legs (on both sides) are completely flush. What you don’t want is the head protruding forward slightly, or recessed back slightly, creating a small step in the joint between the head and legs.

2. Once the head and legs are screwed together, you then saw off the ‘horns’. These are basically the section of the head left sticking out on either side.

(For illustrative purposes, in Figs. 1-3, I have shown the door lining upright. In reality, you want it lying flat on the floor for these steps.)

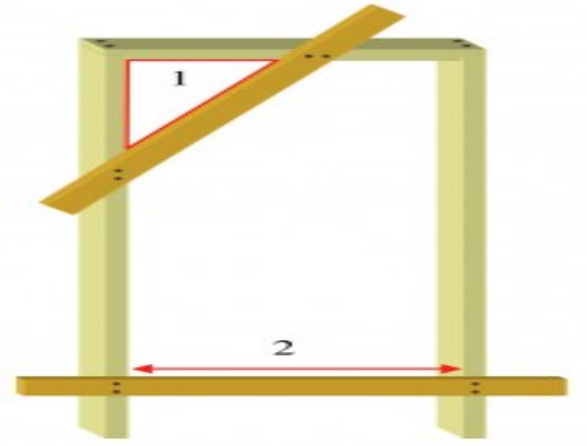


Figure 7 bracing door lining....

Fig. 3. – Bracing door lining to ensure that it is ‘square’.

You now need to brace the lining so that it is totally ‘square’. This is done by using two lengths of batten (typically 50mm by 25mm). One is fixed diagonally across the top corner. The other horizontally near the bottom of the legs – See. Fig. 3.

1. We use a simple formula to ensure that a corner is square, based on the fact that if a triangle has sides that are in a ratio of 3:4:5, then a right angle is always formed. Therefore for door linings, typically we scale this up and measure 30cm along the head, and 40cm down one leg and make a precise mark in each position. You then make an exact 50cm measurement on a length of batten (with excess at each ends), and then fix the batten precisely across the corner of the lining, making sure the marks on your batten correspond precisely with the marks on the head and leg.

Once the corner is braced you measure the exact width of the lining at the top (the interior measurement), and mark this measurement on a second length of batten, again, with excess at each ends.

2. You fit the batten 100-150cm up from the bottom of the lining, making sure that the marks on your batten align exactly with the edge of the lining. What is also essential here is that each leg is marked off at the exact same height. The most accurate way to do this is not to measure up from the base of the legs, but rather, back from the head. A typical measurement may therefore be 1800mm from the head down each leg.

Both battens are held in place with temporary screw fixings, and the reason for the excess, is if you initially cut the battens shorter, you would split the end of the battens as you insert the screws. Screws always split wood if you are too near the end of the length. But once the battens are fixed, you then cut them back flush with the edge of the lining.

- ✓ The lining may now be inserted into your wall opening, or rough opening, as it is generally called.

1. As mentioned above, the battens have been trimmed back flush, but they now stay in position until the lining is securely fixed in place.

2. Depending on how ‘standard’ the rough opening size is, you may need to cut down the height of the lining. You simply do this by trimming both legs of the lining accordingly. Ideally you should leave 5-10mm ‘wriggle’ room above the head.

You are now in a position to start fixing the lining in place. I tend to use 100mm screw fixings, on their own, if you are fixing into wood (studs), or with wall plugs, if going into masonry. For more information on fixing and fixings, see my ‘DIY Basics’ guides. You will also need wedges that you can either make out of wooden offcuts, or you can buy packs of plastic wedges. Personally, I gave up whittling away and making wooden wedges years ago, as the custom made ones make life so much easier, and because they have so many other useful DIY applications, I always have a pack on hand. My favorite variety aren’t to my knowledge available in the big DIY outlets but you’ll find them in Screw fix, and they are also available on Amazon.

You use the wedges to help get the lining exactly vertical (and the head level), as well as getting it precisely positioned, so that any overlap along the front edges in relation to the wall, on both sides of the wall, are the same. The size of this overlap depends on the finished wall depth and for more information on lining depth in relation to wall depth (thickness), again, refer to my guide – 'Interior door frames'.

1. Fixings need to be used in pairs – 5 pairs per leg is ideal.

2 In order not to distort the frame, packing with wedges at the points where the fixings are inserted makes sure that when you insert your screws they don't pull the frame out of shape.

3. Once the lining is fixed in place, you can remove the battens.

The order in which you insert fixings is not of vital importance. I'll tend to get one in at the top of each leg, followed by one in near the bottom, again, checking and rechecking with a spirit level and tape measure, literally, after every fixing. After that, you just fill in the rest. The beauty of screws is that if you get things wrong, you simply unscrew and adjust.

One further point worth bearing in mind is that although you want to keep the lining precisely 'square' etc., the most important leg is the one which will take the hinges. This is where a long spirit level (1.8m) is very useful as when you hold it against a leg, if you see 'light' between the level and the lining, you know it's not quite 'square' so you simply adjust.

As mentioned, my other guide on door frames is well worth reading in conjunction with this guide. Also please see below for other related posts about door fitting, repairs, and maintenance.

Self-Check -6	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is fitting door lining?

Note: **Satisfactory above – 4 out of 8 points Unsatisfactory - below 4 out of 8 point**

LIST OF REFERENCE

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11. https://www.metso.com/products/reclaimers/scraper/

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