

An **Around the House** White Paper



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## Exterior Doors

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## Table of Contents

<b>Version Information</b> .....	<b>2</b>
<b>Scope</b> .....	<b>4</b>
<b>Door Parts</b> .....	<b>4</b>
Pictured .....	4
Not Shown .....	5
Moldings .....	5
<b>Choosing an Exterior Door</b> .....	<b>5</b>
Which manufacturer?.....	5
Which installer? .....	6
Door Features.....	7
Appearance .....	7
Performance .....	9
Installation.....	9
Permits .....	9
Dust Containment .....	9
Attachment.....	10
Caulk and Weather Proofing.	10
Insulation.....	10
Locks.....	11
Trim.....	11
Flooring.....	11
Cleanup .....	12
<b>Conclusion</b> .....	<b>12</b>
<b>Glossary</b> .....	<b>12</b>

## Scope

Although many of the topics covered in this white paper apply to any door (or window, for that matter) that penetrates the exterior of your home, we will not be addressing “specialty” doors like sliding doors, patio doors, and the like. If there is sufficient interest, we’ll update this document at a later date or create a separate document to address those types of doors.

## Door Parts

So that we are all speaking the same language, here is a photograph of an exterior door:



### *Pictured*

**Dead bolt** – The small silver piece on the left hand side of the door slab, just above the thumb latch is the dead bolt lock. It is the primary security device on any exterior door.

**Door Jamb** – The door jamb is the framework that surrounds the top and sides of the door slab.

**Door Sill** – The door sill is the piece that goes under the bottom of the door. In the pictured door, the door sill is one piece and extends under both sidelights.

**Door Slab** – The red part (i.e., the swinging part of the door) is called a door slab.

**Kick Board** – The flat board beneath the door sill is called a kick board. If these were stairs, it would be called a riser.

**Sidelight** – The two fixed panels on either side of the door slab are called sidelights. An exterior may have one, two, or no sidelights.

**Thumb Latch** – The long silver door handle is called a thumb latch. There is no lock on this device.

### *Not Shown*

**Door Hinges** – Because this door swings into the house, the door hinges are hidden in the joint between the right hand side of the door slab and the door jamb on that side.

**Door Knob** – This home owner chose a thumb latch to open the closed door. If the opening device were a different style (i.e., round), it would be called a door knob and may contain a locking mechanism.

**Door Sweep** – At the bottom of the door is one or more vinyl strips either below the door or at the bottom of the door on the inside to seal the door slab / door sill joint from the exterior weather.

**Storm Door** – This particular door does not have a storm door installed. Storm doors will be the subject of a separate white paper to be written in the future.

**Weather Stripping** – Around the edges of the jamb will be strips of material (commonly vinyl or foam) to seal the door from exterior weather.

### *Moldings*

As this is an exterior photograph of the door, you can't see the interior moldings.

Moldings used around the inside of an exterior door are no different than those used around interior doors or the interior of windows.

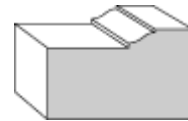
There are many different kinds of exterior moldings. Among the more common are:

**Flat Stock** – Simply plain, flat, boards.

**Brick Molding** – This molding design (drawing at right) has nothing to do with whether you have brick on the exterior of your home or not.

This profile is extremely common. Note: there is a similar molding style that was used here in New England, primarily around windows

that is a little wider than standard brick molding. Very few suppliers carry this style.



## **Choosing an Exterior Door**

If you are in the market for an exterior door, you are probably already aware that there are many choices in materials, features, prices, guarantees, etc. Sometimes this overwhelming array of products, manufacturers, and installers causes the home owner to make his/her choice based on the only thing they understand – price. This is probably the worst way to choose. We recommend that your primary selection criteria be the company that will install your door.

### *Which manufacturer?*

There are a large number of door manufacturers (though not nearly as many as there are window manufacturers). Unlike a replacement window, your choice in exterior doors will probably NOT begin with which manufacturer will create your door. We install mostly Therma-Tru doors, but, if you had your heart set on a solid wood door, you would have to look elsewhere as Therma-Tru manufactures only fiberglass or steel doors.

One note about purchasing a door from a big box store: We have spoken to representatives from Therma-Tru. They have told us that big box stores sometimes special order a door style to be stocked in their stores and sold for a special price. These doors are only available at that time from that chain of home centers. If you want to match it later (say because you replaced your front door earlier and now you want the side door to match), or need replacement parts (e.g., replacement glass), you may be out of luck as neither the store nor the manufacturer will be able to supply them.

### *Which installer?*

This brings us to our suggested primary criteria. How happy you are with your door is likely to be tied more to how it is installed rather than the manufacturer of the door. The best door in the world will be inefficient (or worse) if installed incorrectly and the poorest quality door you can buy can perform adequately if installed properly.

We have replaced many exterior doors and have found that they are rarely installed well. For example, we have seen:

- Doors held in place with nails through the interior and exterior trim.  
This is probably the most frequent thing we see. It is not surprising that a door begins to bind in its frame or starts to let air leak by when it is not adequately fastened to the framing of the house.
- No insulation between the door jamb and the framing of the house.  
Sure, it is not a huge space, but it is not difficult to insulate this space before putting the final trim in place and it can make a difference in how comfortable you feel in your home.
- No sill water proofing.  
Granted, this is a relatively modern convention in door replacement, but we know for a fact that there are still companies out there installing doors this way. If water gets under the door, the last thing you want is for it to start rotting out the framing or interior flooring material in your home.
- No drip cap over the top molding.  
This metal flashing piece is intended to make sure that any water that gets on the side of your house has no way to get behind the trim and begin rotting the framing of your home.
- Dead bolt locks installed without the extra long security screws in place.  
The lock manufacturers provide very long screws and a separate security plate that gives the dead bolt lock its resistance to being kicked in. Without them, the dead bolt lock is really no more secure than the knob lock. Someone with a sledge hammer (or a good swift kick or two) can be in your home in less time than it took you to read this sentence.
- A door that was manufactured to swing into the building installed so that it swung outward.  
A very large security problem as it didn't have the special hinges installed with non-removable hinge pins. The sill also tilted into the building so that any water that got on it was guaranteed to drain inside rather than outside. But it saved the builder a few dollars!

For more information on how we recommend a door should be installed and why, see further ahead.

### *Door Features*

We hope that you now have a better understanding about why we think you should base your selection of a door primarily on the installation company. Now we'll move on to the more fun part of selecting a door; the appearance, features, etc.

#### Appearance

We start with appearance because it can be the easiest to decide upon. Some of your choices:

- Construction Material

There are several available alternatives:

- Solid Wood

We rarely recommend a solid wood door. They are less energy efficient than the other alternatives, are more likely to swell in humid weather, and there are fewer choices in style. However, you may have a very specific style or finish that is difficult or impossible to replicate in another material.

- Steel

Steel doors are foam filled for energy efficiency and are very strong. They can rust if a good coat of paint is not maintained and we have seen dented doors in a few, high impact, situations. They are smooth and must be painted.

- Fiberglass

Also foam filled for energy efficiency, fiberglass doors don't rust or dent, but can warp if paired with a full-view storm door in a "full sun" area. They are available either smooth or with a wood grained pattern that can be either painted or stained to look like some wood species.

We generally recommend fiberglass doors for most applications as they look better, are nearly as durable as steel doors and cost approximately the same.

- Paint vs. Stain

If you choose a steel door, you must paint it. If you choose a wooden or fiberglass door, you may have a choice of paint or stain (not all fiberglass doors can be stained). In fact, you can choose to paint the outside and stain the inside if you choose to do so.

Note that ALL doors should have a finish applied. Unless you have ordered a factory applied top finish, the finish that comes on your door is primer and only meant to protect the door until the top finish can be applied after installation. In fact, not applying a finish in a timely manner may void the warrantee on your new

door.

- Design (Glass and Such)

Page through a door catalogue and you will see a vast array of styles, from the simplest flat door to a door with leaded and stained glass with matching sidelights.

We have even installed entry doors with operable windows in them. This is helpful in situations where you might like some ventilation without the necessity of leaving the door open.

The design of the door and glass (if any) is completely up to your taste and budget. In the catalogue, the doors in the front will be the most impressive and the most expensive.

- Locks and Hardware

We always recommend a dead bolt lock on all exterior doors. A knob lock is very poor security. Dead bolts are available in single cylinder (key outside, knob/lever inside) or double cylinder (key on both sides). Your choice will depend on lifestyle preference and whether the door may be vulnerable to someone breaking the glass and reaching in to unlock the dead bolt.

When choosing hardware, typically, you will choose between thumb latches, knobs, or levers. You will want to pick these out before ordering the door so that the hinges installed by the manufacturer can match the finish on your lock hardware.

In addition, you may want a peep hole or a mail slot cut in the door at the factory.

If the locks are likely to need the keys changed frequently, some lock manufacturers make locks that are designed to be re-keyed by the home owner (i.e., without the help of a locksmith).

If you would like the keys to match your old locks, it is wise to decide that at the start, too so you get a lock that matches the key type you already have and the lock can be re-keyed before installation.

- Other choices

There is a collection of other choices you can make, including:

- Sill finish

Silver (a.k.a. mill finish) is standard, but you can get gold/brass color as well.

- **Opening sidelights**  
Sidelights that open (like a casement window but inward) are available from some manufacturers and have screens installed so that you can get ventilation without requiring that the door be open.
- **Jamb material**  
Door manufacturers now offer jambs made out of composite material instead of wood. Composite materials won't rot like wood might if not adequately protected.
- **Trim material**  
As with jamb material, manufacturers now offer the same trim profiles in vinyl so that it need not be painted (it can if you don't like white) and will not rot like wooden trim may.
- **Fire doors**  
Building codes may require a door with a particular fire rating (e.g., for an entry door between an attached garage and the living space of the home). This may limit some of the other choice outlined above.

#### Performance

Wooden doors are less energy efficient than either steel or fiberglass doors due to the foam insulation in the latter types.

The more glass in your door design the less energy efficient it will be.

Good weather stripping will seal air leaks around any type of door.

#### *Installation*

So far, we have concerned ourselves with the doors themselves. While the construction, appearance, etc. of the doors is important, the installation is even more so. Even the best choice for a door will be disappointing if the installation is done poorly. We don't intend this document to be a "how-to" manual so that you can do your own installation. It is intended to teach you enough about the process that you can ask the right questions of your installation company.

#### Permits

You may need to get a building permit to install an exterior door. Check with your local building officials to determine if one is necessary.

#### Dust Containment

If your home was built before 1978, there are new lead paint regulations that must be dealt with. You need to make certain that your installer has the proper certificates and training.

We recommend you make sure that your installation company is certified for lead dust containment even if your home was built after 1977 and ask if they will be using the same dust containment techniques. This will mean less cleaning for you and less chance of breathing in dust kicked up by the construction process.

#### Attachment

As stated earlier in the paper, we very often find that exterior doors are installed using nails through the exterior and interior trim. This is simply not strong enough to handle the weight and abuse an entry door gets through normal use. Some installers put the door in this way because it is faster to just “shoot” a few nails into the trim with a nail gun than to take the time to attach the jamb to the framing.

The doors we install nearly always come with at least one screw missing from a hinge. The manufacturer intends that the installer will put a long screw through that empty hinge hole in order to carry the weight and force of the door. We use screws on both sides of the jamb to hold the door securely in place. We find them just as easy to install and hide as nails are and they can be adjusted in the future in the unlikely event that it is necessary to do so.

#### Caulk and Weather Proofing

We all know doors should be caulked in to keep air and water on the outside of your home. If there is anything painted around your door (or might be painted sometime in the future), you should not use silicone caulk. The best quality paintable caulk should be used instead.

In addition to caulking around the exterior trim, caulk should be applied underneath the sill to keep air and moisture from leaking in underneath the door. We also install a waterproof membrane (typically used in roofing applications before applying the sill caulk so that the subfloor and framing of your home is protected should any moisture happen to get in there.

It is very important to make sure that the door is installed with all the weather stripping that the manufacturer intended. Many exterior doors come with a couple of small vinyl covered, foam blocks that are intended to be installed in the bottom corners of the door to keep air and moisture out. Far too many installers don't know how to install these pieces and will often throw them in the trash rather than take the time to figure it out.

#### Insulation

Many door installation companies don't bother to insulate. They will say that the caulk that makes your door weather tight is sufficient. We believe that the real reason is that insulation takes time and once the trim has been replaced, you'll never see the empty cavities they've left. Unfortunately, you may “feel” them if air somehow gets around the small bead of caulk they've applied. Either way, an uninsulated cavity will certainly transmit the heat you've spent your hard-earned money on to escape more easily.

We like to use spray foam insulation as it can fill in the odd shapes of the cavities around the new door frame. Fiberglass insulation is better than nothing, but its effectiveness is

reduced if it is compressed (as it has to when shoved into these tight spaces). In addition, fiberglass insulation does not act as a vapor barrier (spray foam does) and moisture from inside your home can condense in the insulation or on the outside envelope of your house and develop mold or further reduce the effectiveness of the insulation. We often say that fiberglass insulation makes a wonderful air filter. It insulates, but does nothing to stop air movement.

#### Locks

Installation of knobs, levers, and thumb latches is straight forward. Dead bolt locks, because they provide most (if not all) the security for your door, require more care in installation.

Every dead bolt lock comes with a heavy duty security plate and long screws that are installed into the wall framing. These pieces are all hidden under the decorative strike plate on the latch-side jamb. If they are left off, you may never know until your door is kicked in by an intruder. Unscrupulous installation companies will toss these pieces in the trash to save time on your installation.

#### Trim

Once the door is installed (level, plumb – both ways, and square), the interior and exterior trim needs to be dealt with.

The exterior trim often comes attached to the door jambs from the factory and usually needs little more than some caulk and paint.

The interior trim often just needs to be reinstalled. Sometimes, however, things don't fit very well and some new pieces need to be cut and fit. If the trim and door are painted, there is some leeway and small gaps can be caulked. If the door or trim are stain grade, they must fit more exactly.

It is also possible that the size of the new door assembly is different than the one removed and this causes the interior door casing to no longer meet up with the baseboards on either side of the door assembly. Make sure your installer will also handle this detail to your satisfaction.

We have encountered doors that were never trimmed out properly to start. In these cases, if the client wants it, we take the time to do the interior trim carpentry over completely.

In any case, nail holes must be filled, perhaps caulk applied, and paint or other finish touched up. You will need to make sure this is included by your installer. It doesn't take much time, but many installers will skip this step in order to move on to the next job in your home or the next customer.

#### Flooring

The new threshold may not meet your existing flooring properly. Correcting this may be a simple matter of caulking a joint, adding (or replacing) tile grout, or installing a piece of molding. There are circumstances where flooring may need to be trimmed or repaired.

In any case, we have encountered situations where the installer was unable or unwilling to make it look right ... at least not without charging an extra fee.

#### Cleanup

As mentioned in the “Dust Containment” section, there are new regulations regarding lead paint. Proper cleanup is necessary as well.

### **Conclusion**

We hope that it is clear that choosing an exterior door based primarily (solely?) on price can be risky. This criterion is what is used if you don’t know what else to base your decision on and assumes that all doors and installers are identical.

Since it is nearly impossible to know how doors are constructed, the quality of the door should be based upon the reputation of the manufacturer. Choosing a premium door from a well-respected manufacturer is, perhaps, the best way to select the exterior door for your home.

Perhaps even more important than the manufacturer of the door is the care taken in installation. A less expensive door that has been installed meticulously is likely to satisfy you more than an expensive door that has been installed haphazardly. To help choose your installer, you can ask for referrals and try to determine if others have been happy with their work. In addition, you can read through the installation section of this paper to come up with some specific questions that can be used to evaluate how carefully they will install your exterior door and service it should you have any trouble in the future.

### **Glossary**

#### Brick molding

A specific profile of molding on the outside of the door to trim the sides and top of the exterior of the door.

#### Building permit

Official permission from your local building regulatory agency to undertake a construction project.

#### Casing

The decorative trim that surrounds the interior of the door top and sides.

#### Caulk

A sealant that, when cured, creates a water and air-tight seal between two surfaces.

#### Dead Bolt Lock

A heavy duty lock that is installed in addition to a door knob, door lever, or thumb latch to provide much improved security (See also, “Single Cylinder” and “Double Cylinder”).

#### Double Cylinder

A lock that requires a key to operate both sides of the lock (See also, “Single Cylinder”).

**Drywall**

The material used to make the surface coating of your interior walls. This may be plaster or some other material, but we use the term “drywall” to indicate the interior finished surface of your walls.

**Fire Door**

A door assembly that is rated to withstand a fire for a minimum specified period (e.g., 20 minutes, 90 minutes, etc.) This type of door may be required by building code in your area.

**Frame**

A rectangular “box” that contains the door slab and is affixed to the framing of your house to hold the door unit securely in place.

**Hinge**

A folding piece of hardware that allows a swinging door to open. On exterior doors there will typically be three or four hinges.

**Insulation**

A material that fills a gap and prevents heat (or cooling) loss. In many instances this material is a fluffy fiberglass mass. We prefer to use spray foam insulation that is squirted into the gap and expands on its own to fill all the tiny nooks.

**Jamb**

The framework that surrounds the door slab. The hinges and lock strike plate are attached to the door jamb.

**Kick Board**

The flat board beneath the sill that creates the back of the “step up” into the home.

**Knob**

A door latching mechanism that opens the door by turning a round shape.

**Lead dust containment**

When lead based paint is disturbed during construction, lead dust can be disbursed and ingested. This is a serious problem, particularly for children and is now regulated by many states (and the federal government for those states that have not taken over regulation).

**Level**

Parallel to the horizon.

**Lever**

A door knob that operates by pressing down on an extended lever rather than grasping and turning a round shape.

**Lite**

The term for each window opening in a door slab.

**Mail Slot**

A device installed into a door that allows the mailman to slip the day’s mail into your home.

**Mill Finish**

A term used for the silver aluminum that is typical on door sills.

Paint grade

The term used to describe materials that will ultimately be painted. Paint grade materials may be primed by the manufacturer, made up of smaller pieces of material that have been joined together, etc.

Patio doors

A wide door assembly in which one or more door is hinged. They are often all glass doors and generally used to exit onto a deck or patio.

Peep Hole

A device installed in a door (typically one without glass or with obscured glass) to be able to see who is on the other side of the door without opening the door.

Plumb

Perpendicular to the horizon.

RRP

See "Lead dust containment."

Screen Door

See "Storm Door"

Sidelight

A fixed panel on one or both sides of the door slab. Sidelights can have glass or not and can be "openable" or not.

Siding

The material used to make the surface coating of your exterior walls. This may be a siding material (wood, cement, vinyl, etc.), stucco, or many other types of material, but we use the term "siding" to indicate the exterior finish of your walls.

Sill

The ledge at the bottom of the door (a.k.a., Threshold).

Single Cylinder

A lock that requires a key to operate only one side of the lock. The other side is operated by a knob or lever (See also "Double Cylinder").

Slab

The moveable part of a swinging door ... the part most people would simply call "the door."

Sliding Doors

A wide door assembly in which one door typically slides along rollers past another, fixed door. They are often all glass doors and generally are used to exit onto a deck or patio.

Spray foam insulation

See "Insulation."

Square

The angles at the corners of the door frame are all 90 degrees.

Stain grade

The term used to describe materials that will ultimately be stained. Stain grade materials will not have a finish on them at installation time and will, generally, have the most even and visually appealing grain patterns, etc.

**Storm Door**

A lighter weight door installed on the outside of an exterior door to increase the energy efficiency of the door assembly or to provide a place for a screen to be mounted and allow ventilation when the exterior door is open.

**Strike Plate**

The hardware into which the lock bolt(s) enter in order to secure the door.

**Sweep**

The system at the bottom of the door that makes the joint between the door slab and door sill weather tight.

**Threshold**

See "Sill."

**Thumb Latch**

A large handle that unlatches the door by the use of a lever you press down with your thumb.

**Trim**

A term encompassing casing and exterior molding.

**Weather stripping**

A system that keeps air and moisture from passing around the edges of the door slab.