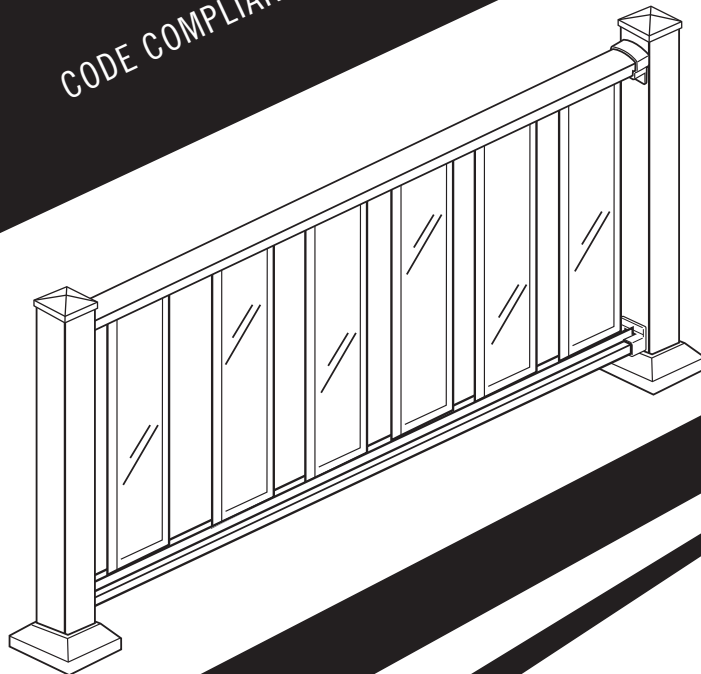# Handrail Glass & Aluminum Railing Systems

CODE COMPLIANT RAILING FOR YOUR LIFESTYLE

Care and Maintenance

While most powder coat finishes are tougher and much more flexible than conventional solvent based paints, they are about the same hardness as automotive paint and can scratch. To clean a powder coated surface, use the same care and methods you would use to clean your car. Gently wash with a clean, soft cloth and a mild detergent followed by a clear water rinse. Even though most powder coatings are highly resistant, certain solvents can harm them. Avoid contact with nail polish remover, paint or lacquer thinner, motor oils, transmission and brake fluids or solvent based cleaning fluids. If any of these should contact the powder coated surface, immediately wipe the area with a soft, clean cloth, and wash as described above.

Congratulations!

You are on your way to a maintenance free railing system that is easily assembled and installed. With your new railing system, you'll feel safe being protected by the tremendous strength of its aluminum alloy components, plus be comforted knowing the hardened powder coated finish will last year after year.

www.maddenmetals.com

For assistance call Madden Manufacturing
**573-365-7085**

Contents

**Please take a moment to read the instructions
before you begin assembling your railing.**

Introduction

Check the contents of Handrail box with these instructions to verify all parts are present. This will allow you to become familiar with the components of your new Handrail system.

• Inspect all component parts for familiarity
• Layout recommended tools
• Before cutting any component, know its use – "measure twice and cut once"
• The included wood fasteners are ACQ treated lumber approved
• The included concrete fasteners are for brick and concrete

**Handrail shown with Posts and
Base Covers sold separately.**
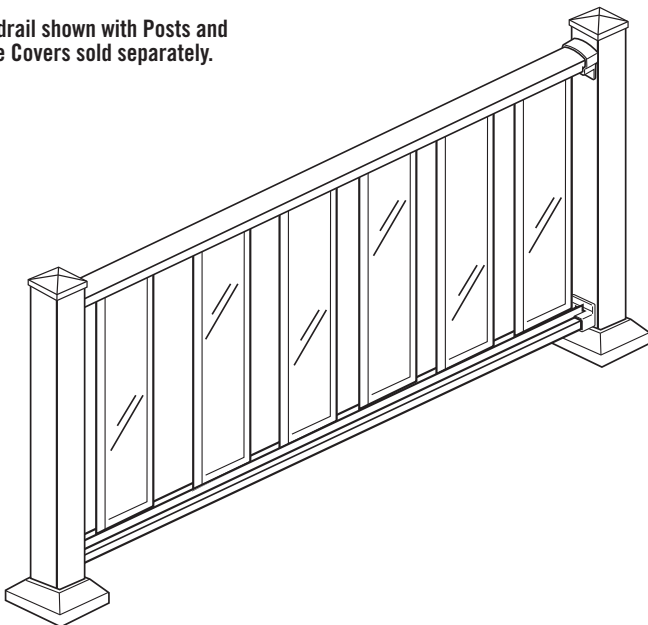
Tools You Will Need
(not included)

A - Level
B - Chop Saw (60 tooth wood blade)
C - Safety Glasses
D - 5/16" Hex Bit Driver
      1/4" Hex Bit Driver
E - Tape Measure
F - Screw or Impact Gun
G - Pencil
H - Drill Bits:
      1/8" wood, 1/4" wood, 1/4"x 3.5"concrete
I - (2) pcs 10" 2 x 4 lumber to support
      railing during installation (optional)
J - Ear Protection

**Time Saver Tip:
Cut (2) 2x4's to
6 inches and (2)
2x4's to 28 inches
for residential
or 34 inches for
commercial
height railing.
Use a string line
for long runs.**

A

B   C

D   E

F   G

H   I   J
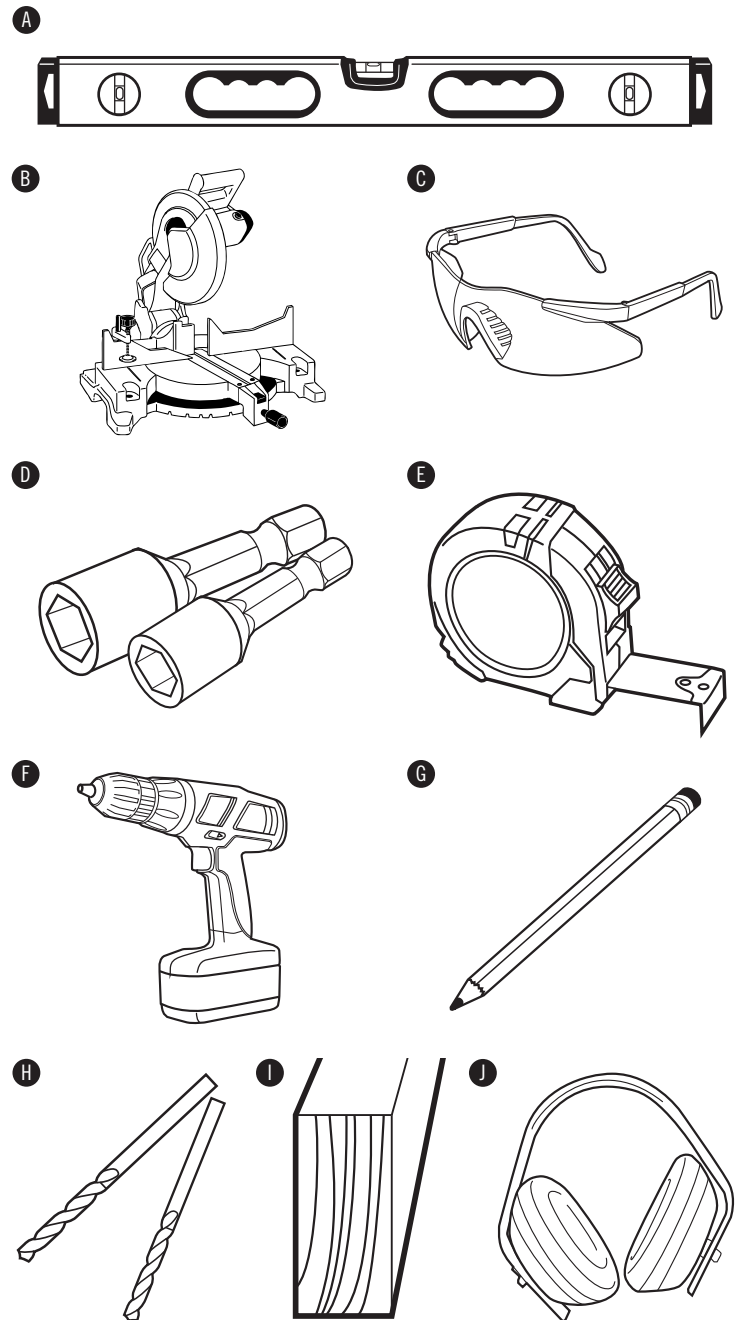
Glass Railing Box Contents

Glass Railing Components

Top Cap (A)
Glass Channel (B1, B2)
Bottom Channel (C)
Bottom Post Mount (D
Top Post Mount (E)
Setting Block (F)
Glass Spline (G)

Glass Baluster (H)
1" Self Tapper (J)
Mid Support (K)
Glass Spacer (L)
Tapcon (N) (Concrete)
Mid Support Template (M)

6 Ft. Glass Railing Kit

Qty	Length	Description	Qty	Length	Description
1	6'	Top Cap (A)	6	Each	8" Glass Baluster (H)
2	6'	Glass Channel (B1 & B2)	12	1"	Self Tapping Fastener (J)
1	6'	Bottom Channel (C)	1	3.5"	Mid Support (K)
2	Each	Bottom Post Mount (D)	14	3 3/4"	Glass Spacer (L)
2	Each	Top Post Mount (E)	8	2 1/4"	Tapcon Fastener (N)
12	1"	Setting Block (F)			(Concrete)
1	27 pcs	Glass Spline (G)	1		Mid Support Template (M)

8 Ft. Glass Railing Kit

Qty	Length	Description	Qty	Length	Description
1	8'	Top Cap (A)	8	Each	8" Glass Baluster (H)
2	8'	Glass Channel (B1 & B2)	12	1"	Self Tapping Fastener (J)
1	8'	Bottom Channel (C)	1	3.5"	Mid Support (K)
2	Each	Bottom Post Mount (D)	18	3 3/4"	Glass Spacer (L)
2	Each	Top Post Mount (E)	8	2 1/4"	Tapcon Fastener (N)
16	1"	Setting Block (F)			(Concrete)
1	36 pcs	Glass Spline (G)	1		Mid Support Template (M)

Glass Railing Assembly Overview

Top Post Mount(E)   8" Wide Glass Balusters   Top Rail Assembly(A)(B1)

(G)   (L)   (G)   (L)

(G)   (L)   (G)   (L)

Bottom Post Mount(D)   Glass Spline(G)   Glass Spacers(L) Not to exceed 3 3/4"   Bottom Channel Assembly (C)(B2)
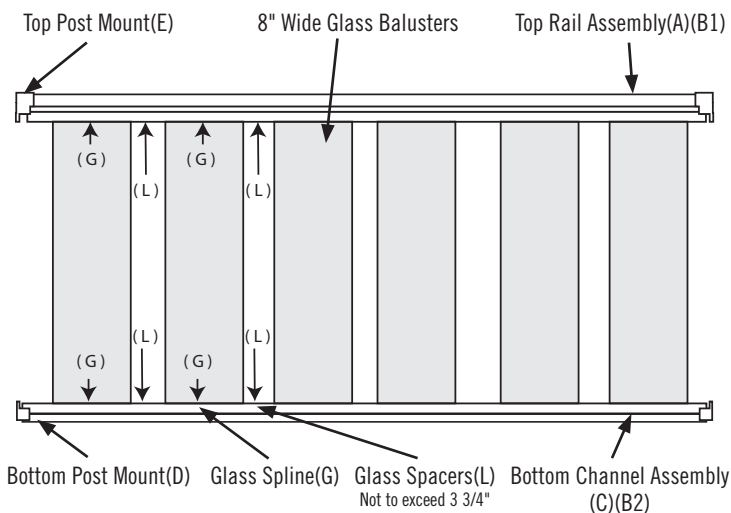
Illustration #1

Glass Handrail installed heights are 36" for residential and 42" for commercial. Always start installation (Glass Spacer or Glass Baluster) at the midpoint of the handrail section.

Note: EZ Posts heights are 38" for residential railing and 44" for commercial railing (sold separately). This product works with ADA Handrail. Ask you local building supply source for more information about ADA Handrails.

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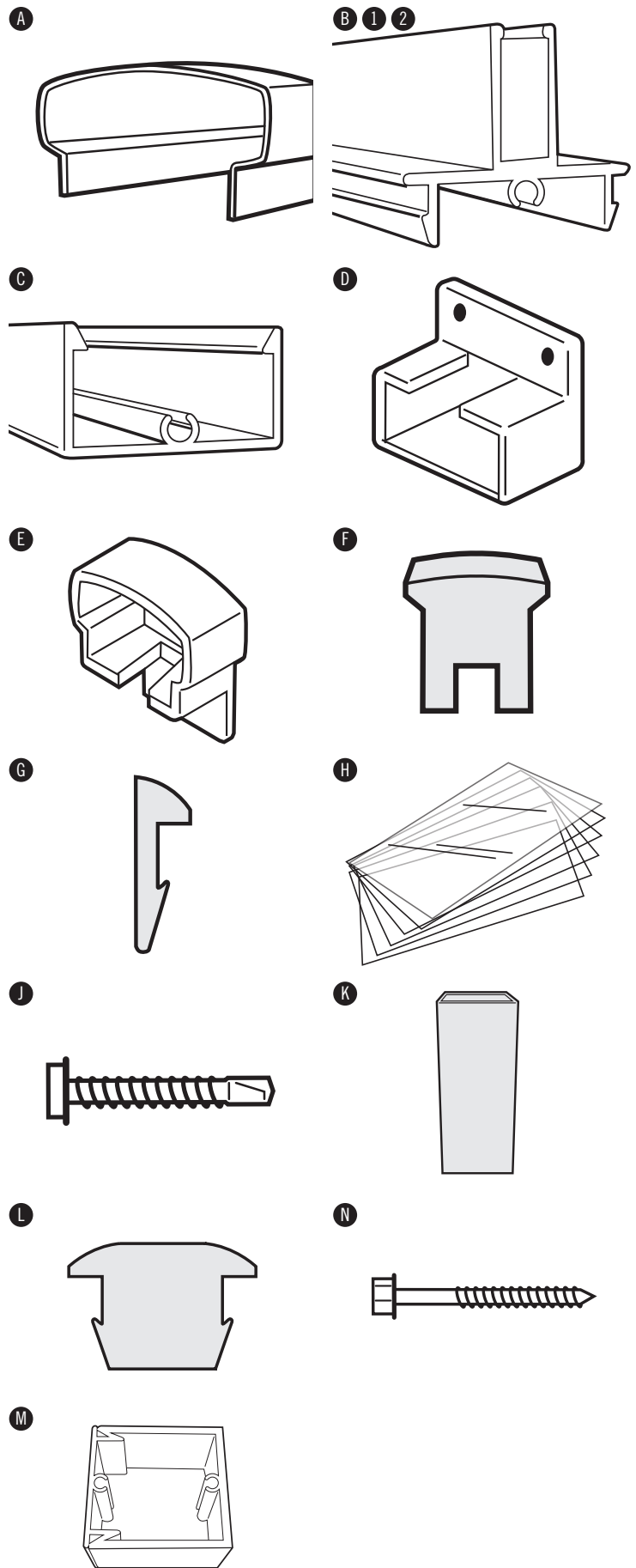
For assistance call Madden Manufacturing
**573-365-7085**

Post Installation with Welded Base Plate

Start by ensuring that you have a solid and level mounting surface for your post(s). Washers or galvanized/stainless metal shims (not included) may be used to plum posts.

Post Mounts are installed with railing sections in later steps. Mounts shown for informational purpose only in this step.

Stair Adjustable Mount
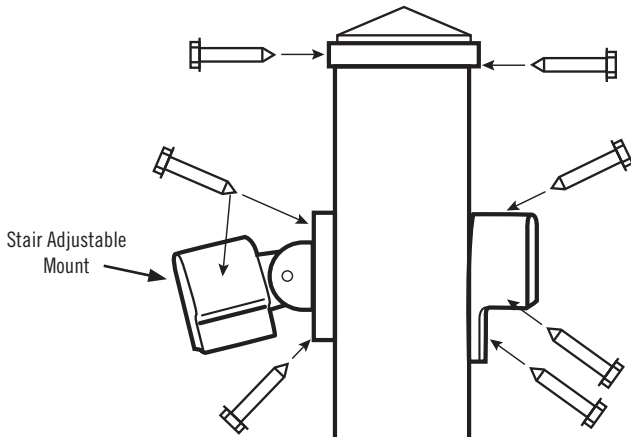
IMPORTANT: The distance between posts should not exceed 6 ft. when installed above ground level. Always refer to your local building department for building code clarification.

Stair Adjustable Mount
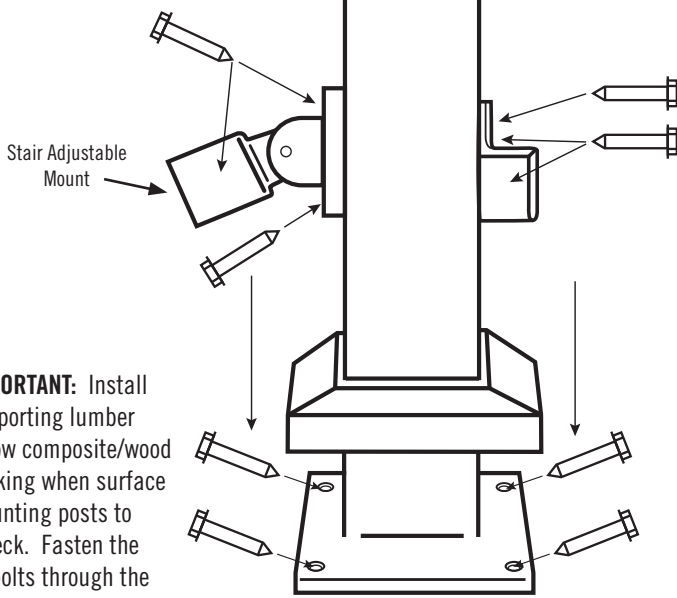
IMPORTANT: Install supporting lumber below composite/wood decking when surface mounting posts to a deck. Fasten the 4" bolts through the decking and supporting underside lumber with the provided tee nuts.

Note: When installing the post base into ACQ lumber, use stainless steel bolts (not included)

Installation into wood/composite decking/Non ACQ lumber:

1. Determine the 3"x 3" post location(s). Spacing between posts should be 6' or less to meet IBC codes when installed 24" or higher above the ground.
2. We recommend the edge of the 5"x 5" base plate is fastened at least 1 3/4" in from the edge of the deck (do not lag screw into the rim joist unless absolutely necessary).
3. Reinforce the decking with support lumber "backer board". A piece of 2"x 10" lumber cut to fit tightly between the joists and installed flat under the decking works great.
4. Square up the post with the deck and mark all (4) holes with a pencil.
5. At your (4) pencil marks, drill a ¼" hole through the decking and backer board.
6. Using a 7/16" socket bit in your drill, thread the 1/4"x 4" Thru Bolt into the post plate, through the deck, and through the backer board. **
7. Thread the Tee Nut onto the 4" Thru Bolt underneath the decking and support lumber.
8. Tighten post firmly to deck.
9. Slide on optional post base cover to hide fasteners.
10. Attach post cap after railing has been installed using 1" fasteners provided.

*** Note: The 4" Thru Bolt fits very tightly into the post base plate (especially Textured Black Posts due to thicker powder coat finish) and in some cases must be predrilled using a 1/4" drill bit.*

Installation into concrete

1. Turn the post upside down on a hard surface and prepare to drill larger holes in base plate. Enlarge the (4) existing post base plate holes to 5/16" (using a 5/16" drill bit).
2. Determine the 3"x 3" post location(s). Spacing between posts should be 6' or less to meet IBC codes when installed 24" or higher above the ground.
3. We recommend the edge of the 5"x 5" base plate is fastened at least 1 ½" in from the edge of any concrete face (assuming normal weight concrete).
4. Square up the post with the concrete surface and mark all (4) holes with a marker.
5. At your (4) marks, drill a 1/4" to 3 1/2" or deeper hole into the concrete using a masonry bit.
6. Fasten post in place with provided 1/4" x 3" Powers Wedge Bolts
7. Begin tightening the anchor with socket wrench or impact wrench by rotating clockwise and applying pressure in toward the concrete.
8. Continue tightening the anchor until the head is firmly seated against the post base plate. (Do not over tighten).
9. Slide on optional post base cover to hide fasteners. Attach post cap after railing has been installed using 1" fasteners provided.
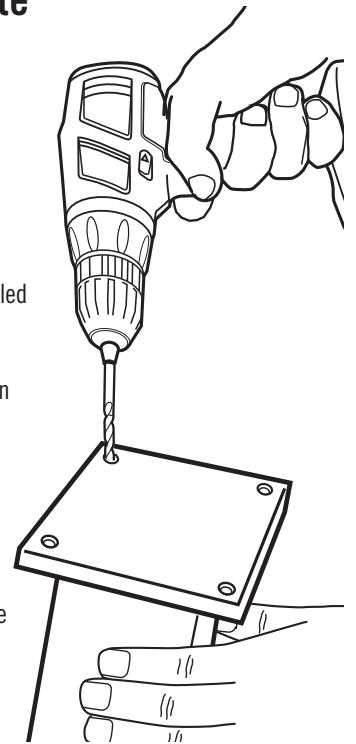
IMPORTANT !!! DO NOT ASSEMBLE BOTTOM RAIL UNTIL THE MID SUPPORT (K) IS ATTACHED TO BOTTOM CHANNEL (C)

Constructing the Bottom Glass Channel Assembly

1. Measure the distance between your existing posts or newly installed Posts. A more accurate measurement is taken near the bottom of the posts (Illustration #2).
2. Subtract a 1/2" from the total measurement to allow your assembly and Bottom Post Mount to pass the post without scratching the finish. Example: If the measurement is 60" inches cut C & B1 to 59 1/2" inches.
3. Cut your Bottom Channel (C) and Bottom Glass Channel (B1) to the adjusted measurement.
4. Using the Mid Support Template (M), drill 1/8" pilot holes at center of Bottom Channel (C). Illustration #3
5. Using 1" Self Tapping fasteners, attach Mid Support (K) to the Bottom Channel (C)
6. Next, snap Glass Channel (B1) with Bottom Channel (C). Keep the ends flush. Start at one end and press together until you hear the pieces snap, then continue to the other end. (Illustration #3A). **This is a VERY TIGHT fit, a wood block and hammer may be required to join the bottom rails.**
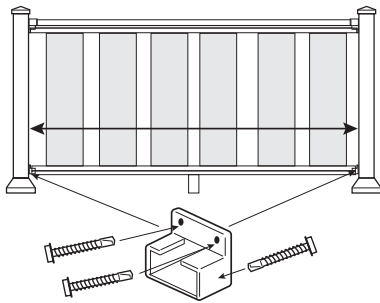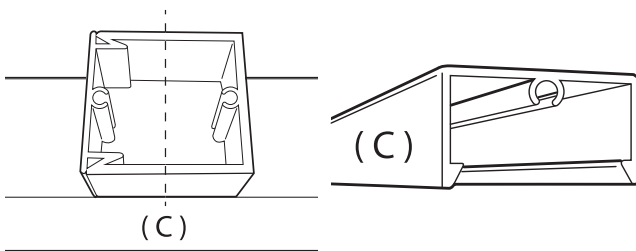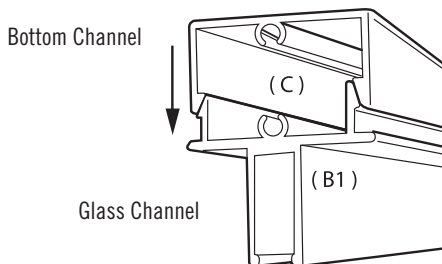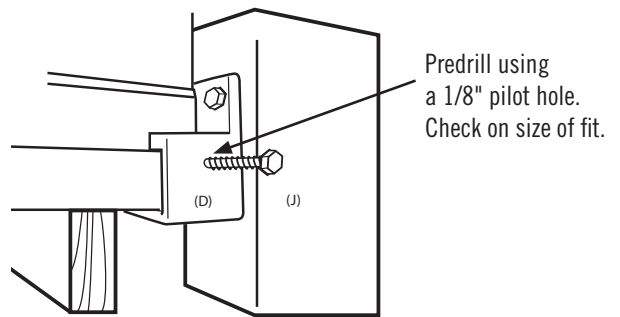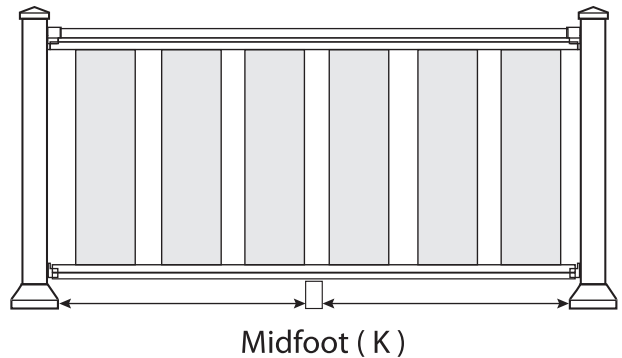
Installing the Lower Assembly

1. Place the Bottom Post Mounts (D) on each end of the Bottom Channel Assembly making sure the fastener portion is facing up. (Illustration #4).
2. Attach the Bottom Channel Assembly to your post. (The maximum distance from the decking / flooring to the bottom of the Bottom Glass Channel Assembly is 3 3/4".(Illustration #4).
   Suggestion: The width of a 2 x 4 is 3 1/2", some contractors will install the Bottom Channel Assembly by setting it on 2x4's at both ends.
3. Fasten the Bottom Channel Assembly Post Mounts (D) to the post using the appropriate fasteners (J, M, N). (See post detail page if necessary).
4. Secure a third fastener (J) through the side of the Bottom Post Mount (D) securing the Bottom Channel Assembly to the Bottom Post Mount. This fastener should be placed on the outside (non viewable side) of the railing as indicated below. Repeat at the opposite end.

Midfoot (K)

Illustration #2

(C)

(C)

Illustration #3

Bottom Channel

(C)

(B1)

Glass Channel

Illustration #3A

Predrill using a 1/8" pilot hole. Check on size of fit.

(D)   (J)

Spacing is not to exceed 3 3/4" from the bottom of the channel to the deck.

Illustration #4

Constructing the Upper Glass Channel Assembly

1. Measure the distance between your existing posts or newly installed Posts. A more accurate measurement is taken 36"up from the deck. (Illustration #5).

2. Subtract a 1/2" from the total measurement to allow your assembly and Top Post Mount to pass the post without scratching the finish. Example: If the measurement is 60" inches cut A & B2 to 59 1/2" inches.

3. Cut Top Cap (A) and Top Glass Channel (B2) to the adjusted measurement.

4. Next, snap Top Cap (A) with Top Glass Channel (B2). Keep the ends flush. Start at one end and press together until you hear the pieces snap, then continue to the other end. (Illustration #6).

5. After the Top Cap Assembly is snapped together, place the Top Post Mounts (E) on each end making sure the fastener portion is facing down.
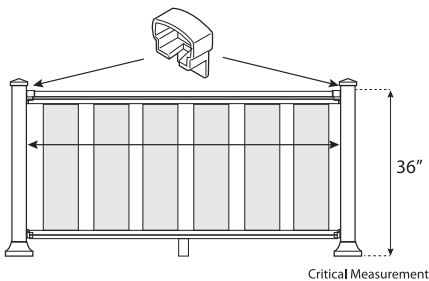

36"

Critical Measurement

(A)

(B2)

Illustration #5   **Illustration #6**

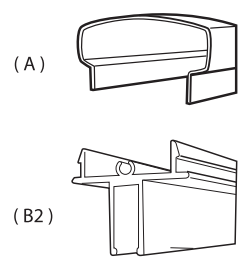
Installing the Upper Assembly

1. The inside dimension of the upper Top Glass Channel Assembly and the lower Bottom Glass Channel Assembly must be installed exactly 28" apart for the Glass Balusters to fit properly for residential railings (34" for commercial railings).

   Suggestion: Cut (2) 2 x 4's at 28"(if you have not already done so). Place the 2 x 4's on end between the assemblies for proper spacing of the Top Assembly. (Illustration #7). Use 34" 2 x 4's for commercial height railing.

2. After locating the placement of the Top Rail Assembly, fasten the mounts to the post using the appropriate fasteners (J, M, N). (See previous post detail).

3. Place a third fastener (J) through the side of the Top Post Mount E) securing the Top Glass Channel Assembly to the Top Post Mount. This fastener should be placed on the outside (non viewable side) of the railing as indicated below. Repeat at the opposite end.
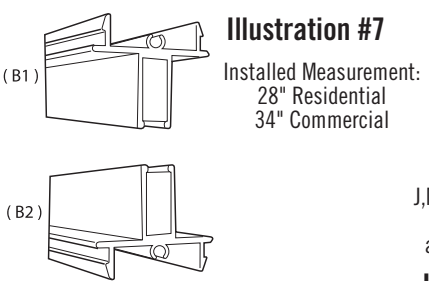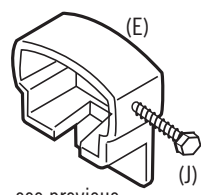

(B1)

Illustration #7
Installed Measurement:
28" Residential
34" Commercial

(B2)

(E)

(J)

J,M, or N - see previous post detail page for appropriate fastners
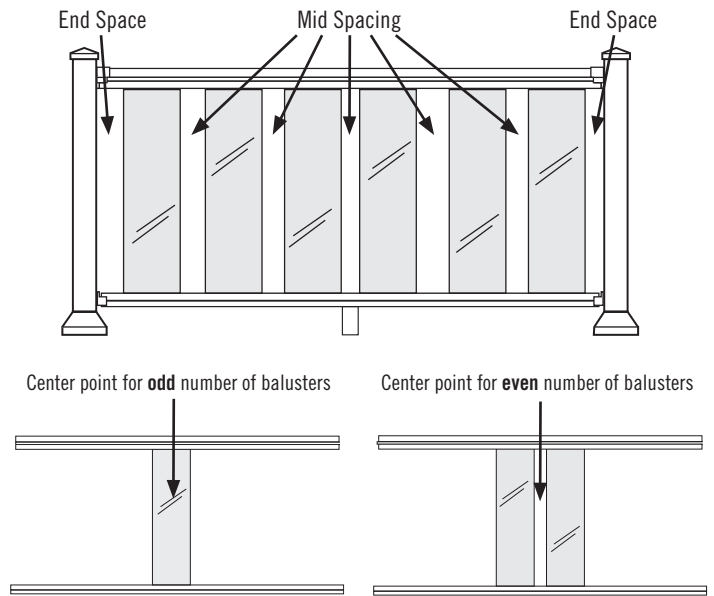
Illustration #7B

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10

Glass Baluster Layout
(DO NOT INSTALL GLASS AT THIS POINT)

After you have installed the Top Rail Assembly and Bottom Rail Assembly, you are ready to lay out your Glass Baluster pattern. Using the chart below determine the appropriate spacing between Glass Balusters. Lay out the Glass Balusters and Glass Spacers (L) in front of the railing section using the appropriate spacing. Ensure spacing does not to exceed 3 15/16" in order to comply with International Building Codes.

The Spacing Table (below) lists different rail lengths with possible spacing scenarios. These calculations are not mandatory, only suggestions.
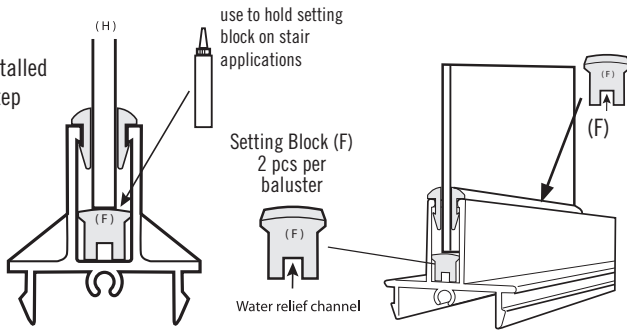
End Space   Mid Spacing   End Space

Center point for **odd** number of balusters   Center point for **even** number of balusters

Rail Length	Approximate End Space	Approximate Mid Spacing	Approximate End Space	Quantity of Glass Balusters
96 in.	2 7/8	3 3/4	2 7/8	8
94 in.	1 7/8	3 3/4	1 7/8	8
92 in.	7/8	3 3/4	7/8	8
90 in.	2 1/2	3	2 1/2	8
88 in.	1 1/2	3	1 1/2	8
86 in.	3 3/4	3 3/4	3 3/4	7
84 in.	2 3/4	3 3/4	2 3/4	7
82 in.	1 3/4	3 3/4	1 3/4	7
80 in.	3	3	3	7
78 in.	2	3	2	7
76 in.	1	3	1	7
74 in.	3 5/8	3 3/4	3 5/8	6
72 in.	2 5/8	3 3/4	2 5/8	6
70 in.	1 5/8	3 3/4	1 5/8	6
68 in.	2 1/2	3 3/4	2 1/2	6
66 in.	3 3/8	3	3 3/8	6
64 in.	2 5/8	3 3/4	2 5/8	5
62 in.	3 1/2	3 3/4	3 1/2	5
60 in.	2 1/2	3 3/4	2 1/2	5
58 in.	3	3	3	5
56 in.	1	3	1	5
54 in.	3 1/2	3 3/4	3 1/2	5
52 in.	2	2	2	5
50 in.	3 3/8	3 3/4	3 3/8	4
48 in.	2 3/8	3 3/4	2 3/8	4

For assistance call Madden Manufacturing
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11

Placing Setting Blocks in Bottom Glass Channel

1. Place two Setting Blocks (F) in the Bottom Glass Channel Assembly for each Glass Baluster (H). Make sure the water relief channel is facing down. Use silicone caulk (sold separately on top of setting blocks to secure glass in place. Do not install glass at this time. The Top Assembly does not require setting blocks.
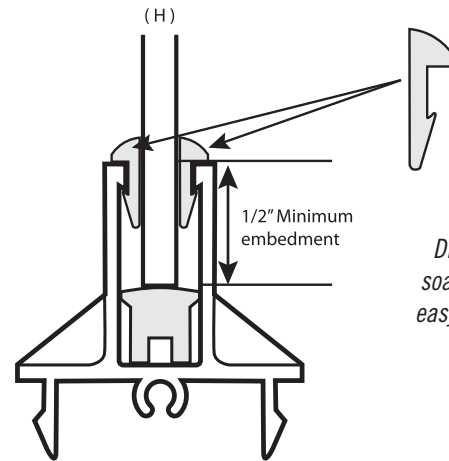
Note: Use silicone caulk to hold Setting Blocks (F) in place for stair or ramp installations. (Silicone caulk sold separately).

Note:
Glass installed at next step

use to hold setting block on stair applications

Setting Block (F) 2 pcs per baluster

(H)

(F)

(F)

(F)

Water relief channel

Installing the Glass Balusters

STEP 1:

1. Ensure the Setting Blocks (F) are 1/2" inch in on each side of the Glass Balusters. (Illustration #11). Glass must rest on the Setting Blocks.
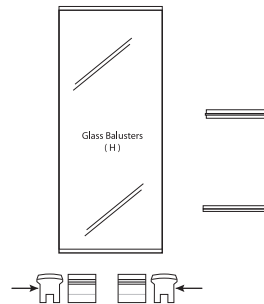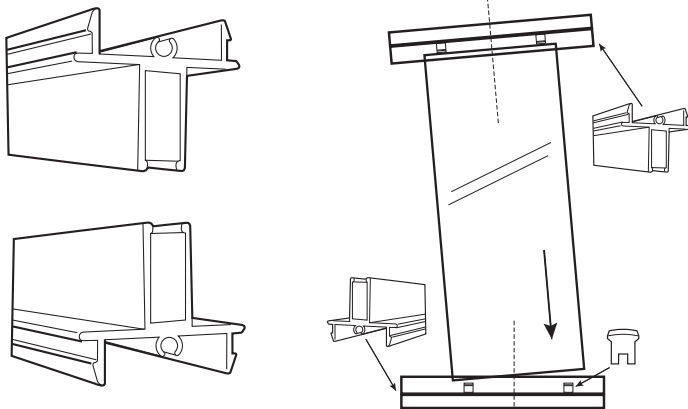
Glass Balusters (H)
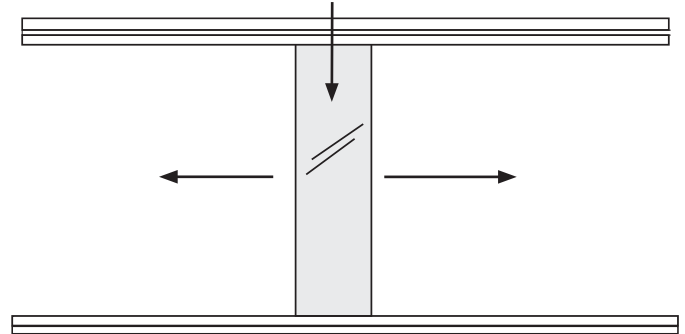
Illustration #9

1/2" from edge

STEP 2:

1. Starting with the most middle Glass Baluster, lift the Glass Baluster up into the Top Assembly. Swing the baluster over the Bottom Assembly into position. Gently set the glass onto the caulked setting block.

Installing the Glass Spline

1. After checking for the proper glass embedment of 1/2" in., apply the Glass Spline (G) around your first Glass Baluster (H) at the bottom assembly and then the top assembly. (Illustration #12)

(H)

1/2" Minimum embedment

*Tip:
Dip spline in soapy water for easy application*

Install this baluster first
if your railing section has an **ODD** number of glass balusters

Create gap first
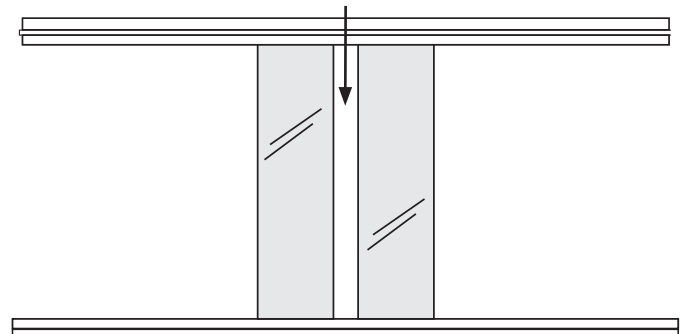if your railing section has an **EVEN** number of glass balusters

Illustration #12

**For assistance call Madden Manufacturing
573-365-7085**

Installing the Glass Spacers

1. After installing the midpoint Glass Baluster (H) with four pieces of Glass Spline (G), it is now time to install the Glass Spacers (L).

2. MEASURE ALL GLASS SPACERS TO ENSURE UNIFORM SPACING BETWEEN GLASS BALUSTERS. The standard
Glass Spacer length is approximately 3 3/4". Trim the spacers as necessary using a utility knife or razor blade. Code requires gaps between balusters to be less than 4 inches.

3. Install a spacer firmly against each side of the Glass Baluster at the top and at the bottom. Glass Spacers will not slide once installed.

4. Install the next Glass Baluster. Repeat glass installations steps until you have finished with your Glass Handrail section.

Glass Spline   Glass Spacer
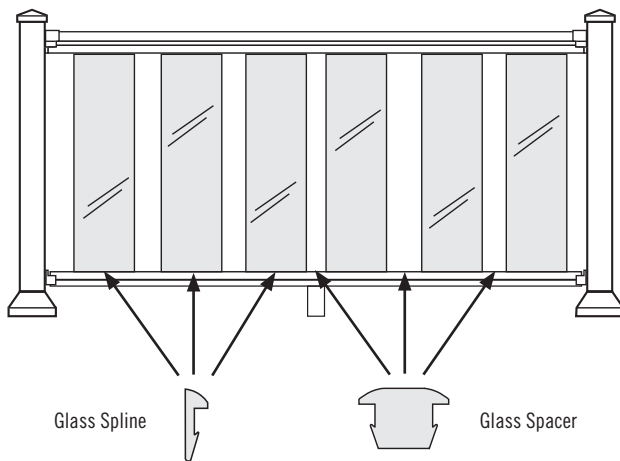
Stair Applications and Non 90-degree Angles

This kit is manufactured for level runs only. For stair installations, custom Glass Balusters must be ordered through your local retailer. One Handrail Pivot Mount Kit (PMW) is required for each stair section as well. (Illustration #13) stair components.
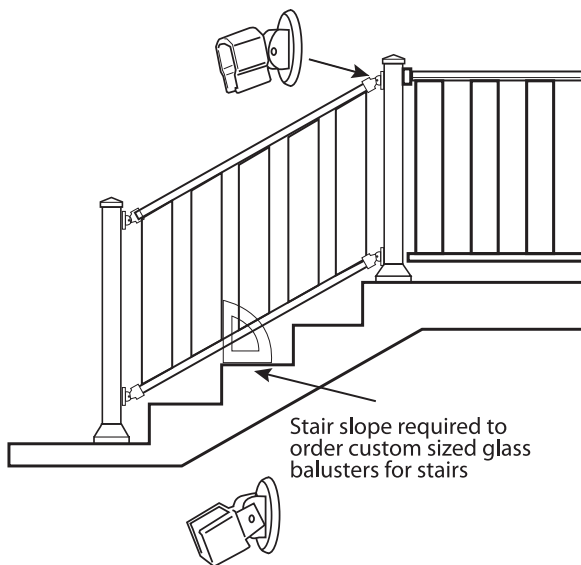

Stair slope required to order custom sized glass balusters for stairs

Illustration #13

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14

Stair Railing Helpful Hints & Apps

RISE	RUN (TREAD LENGTH)								
	10"	10.5"	11"	11.5"	12"	12.5"	13"	13.5"	14"
5"	27°	25°	24°	23°	23°	22°	21°	20°	20°
5.25"	28°	27°	26°	25°	24°	23°	22°	21°	21°
5.5"	29°	28°	27°	26°	25°	24°	23°	22°	21°
5.75"	30°	29°	28°	27°	26°	25°	24°	23°	22°
6"	31°	30°	29°	28°	27°	26°	25°	24°	23°
6.25"	32°	31°	30°	29°	28°	27°	26°	25°	24°
6.5"	33°	31°	30°	29°	28°	27°	27°	26°	25°
6.75"	34°	33°	32°	30°	29°	28°	27°	27°	26°
7"	35°	34°	32°	31°	30°	29°	28°	27°	27°
7.25"	36°	35°	33°	32°	31°	30°	29°	28°	27°
7.5"	37°	36°	34°	33°	32°	31°	30°	29°	28°
7.75"	38°	36°	35°	34°	33°	32°	31°	30°	29°

Tip#2: Smartphones and tablets have good (free) angle finder apps

Gate Instructions

Gates can swing left or right depending on the hinge location. Standard hinges and gravity latch are include with all Gates. Note: Self closing hinges and pool child safety latch sold separately.

1. Verify rough opening between posts is 1" greater than width of gate.
2. Set gate in opening and visually identify where hinges will attach to gate for the desired swing direction.
3. Measure 3" down from the very top of gate and attach hinge to appropriate gate face using the provided fasteners.
4. Attach 2nd hinge 3" down from the very top of the gate and attach gate latch arm to appropriate gate face using the provided fasteners.
6. Place (2) 2 x 4's on edge in the gate opening so the gate may rest in place while attaching the hinges to the post.
7. Level gate in position and fasten top hinge to appropriate post face with a single fastener only.
8. Confirm levelness and attach bottom hinge to post using all three fasteners.
9. Complete installation of top hinge with remain two fasteners and remove 2 x 4's. Hold gate latch on latch arm, swing gate closed, mark holes and fasten latch to post.

Available gate sizes:
Residential: 36"W x 36"H
Commercial: 36"W x 42"H
Pool Gate: 36"W x 48"H

Typical railing Heights:
Residential: 36"
Commercial: 42"
Pool Fencing: 48"-54" (check local codes)

For assistance call Madden Manufacturing
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15