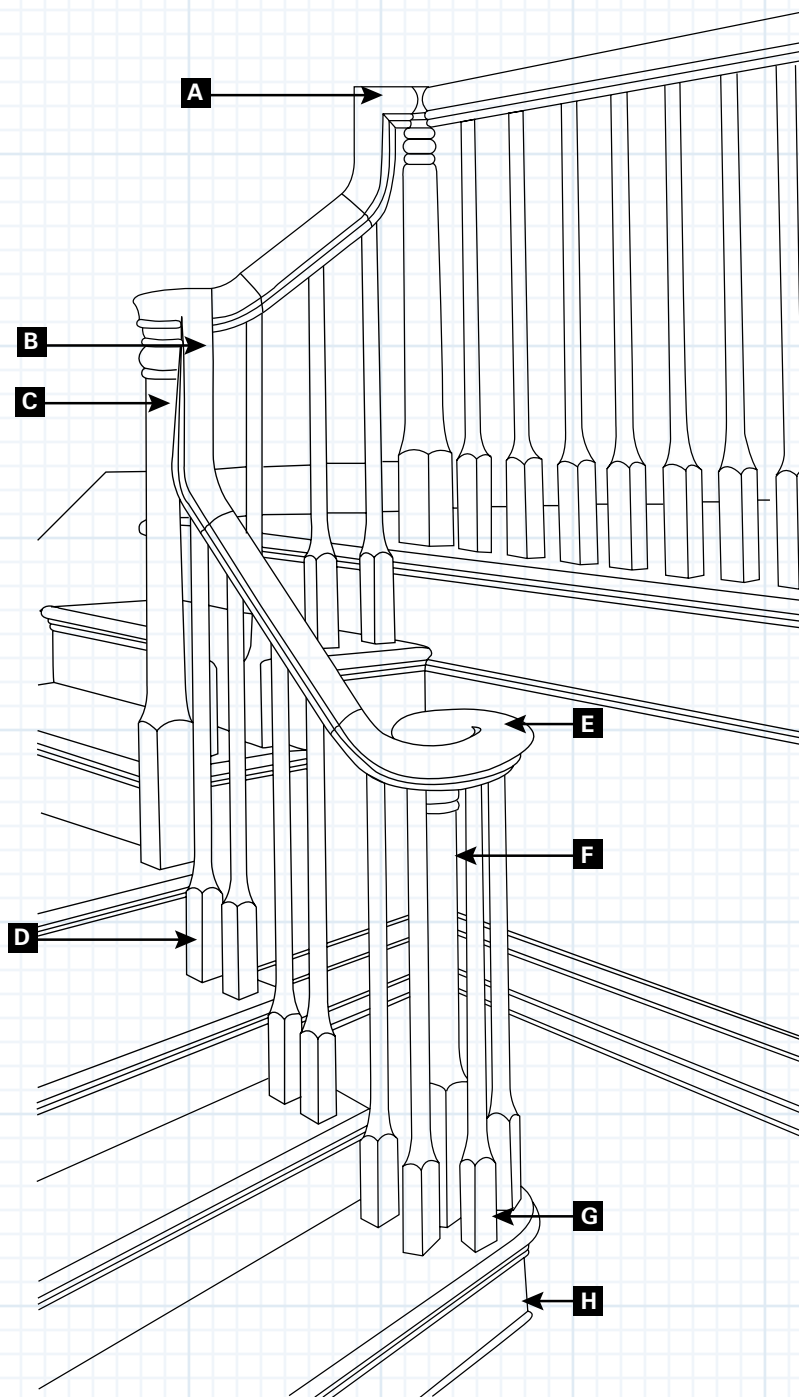


- A** Right Hand Gooseneck  
Riser Level Quarterturn  
with Cap
- B** Right Hand Gooseneck  
Riser Quarterturn with Cap
- C** Landing Newel
- D** Tread Baluster
- E** Right Hand Volute
- F** Volute Newel  
(with Pin through Tread)
- G** Volute Baluster
- H** Starting Step Unit



## GENERAL REQUIREMENTS

1. All risers must be equal in height for the entire run of the stairway. Treads must be equal in width. A tolerance of less than 1/8" must be kept. This requirement alone means extra care must be taken in planning and laying out.
2. Watch headroom clearances on interior stairs.
3. Tread width must be at least 9".
4. Rise, not riser, cannot exceed 8".
5. Tread overhang (nosing) should not exceed 1 1/2".
6. The ideal rise to run ratio is 7 to 11 or, "the sum of 2 risers and 1 tread should equal 25". The proper rise to run ratio is important in making a stair comfortable to travel.
7. Stairways should be at least 36" wide.

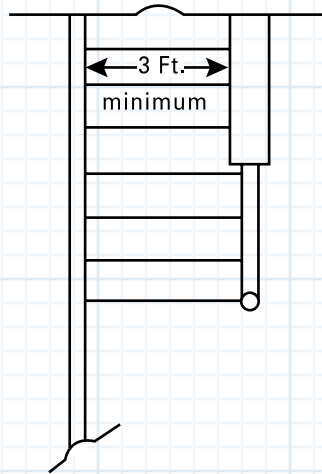
### Handrails should be:

- a. 42" high on outdoor decks, landings, balconies.
- b. 36" - 42" high on interior landings, lofts, balconies.
- c. 34" - 39" on stairs, measured from nose to tread.
- d. At least 1 1/2" away from walls (2" is better).
- e. Constructed so that a 4" sphere cannot pass through the balustrade at any point.

*The following are general guidelines designed to help plan your stairway and to simplify installation. We have other publications available for detailed construction guidance.*

## GUIDELINES FOR STAIRWAY INSTALLATION

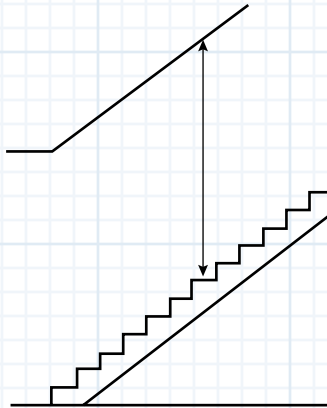
### STEP 1



### Determine Stair Width

The width should be at least 3' 6"

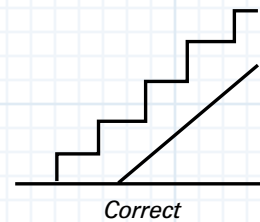
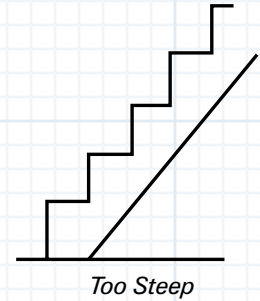
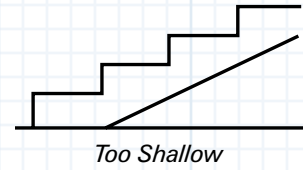
### STEP 2



### Measure Stair Headroom

Minimum 6' 6"

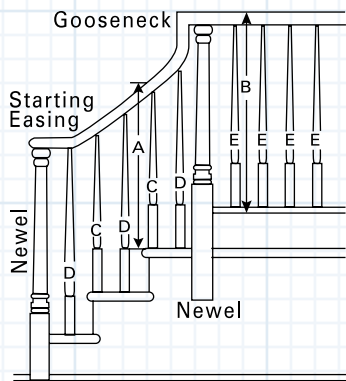
### STEP 3



### Determine Proper Stair Rise and Run

Stairways should not have risers of more than 7 3/4" and not less than 7". Tread width (run) should not be less than 9 1/2", not including nosing. The degree of angle (pitch) of a stairway should be between 32 1/2° and 37° for safety.

**STEP 4**

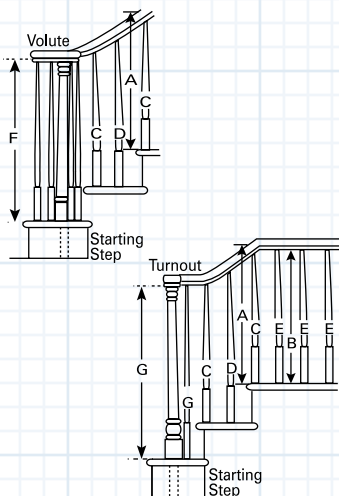


**Determine Rail Heights:**

Code Requirements:

- A. 34" to 38"  
We recommend 34" to 36"
- B. 36" to 42"  
We recommend 36"

Most codes now use 36" as their minimum.

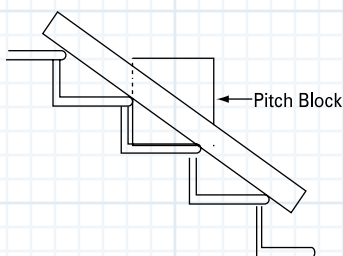


**General Requirements:**

(letters are keyed to illustration)

- A. 34" - 38"
- B. 36" - 42"  
(36" interior, 42" exterior)
- C. 34" Baluster
- D. 36" Baluster
- E. 39" or 41" Baluster
- F. 39" - 41" Baluster  
(under Volute, Turnout)

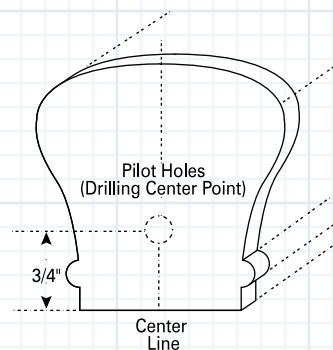
**STEP 5**



**To Find the Pitch:**

1. Cut a square piece of plywood to a dimension slightly larger than the tread width and riser height.
2. Obtain a straight edge 4" or longer.
3. Place the straight edge on the stairway (or nosing) of 4 or more treads (excluding the first tread).
4. Cut the plywood square along this line to form the "pitch block."

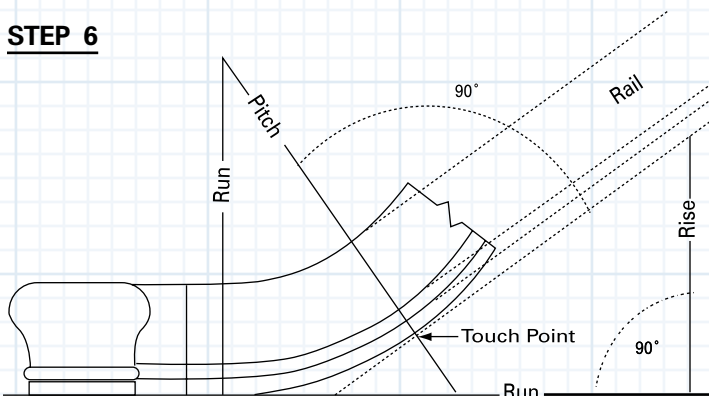
**STEP 7**



**Make a Template:**

1. Cut a piece of rail approximately 1/4" thick.
2. Drill a 1/4" hole on center line and drill up 3/4" from the bottom.
3. Mark one side "fitting" and the other side "rail."

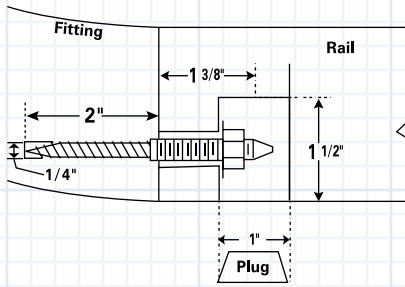
**STEP 6**



**To Cut Fittings to Attach to Handrail:**

Place fitting and pitch block on a flat surface. Move the pitch block to the fitting to the point they touch, and mark this point. Turn the pitch block upright, mark cutting line, and make cut square to the rail. Cut the rail to length after fittings are cut and placed. All rail cuts are square.

**STEP 8**



**Drill Holes in Fittings and Rail:**

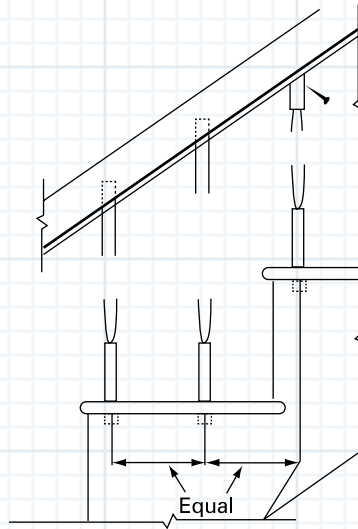
After fittings have been cut to the proper pitch:

1. Take drilling template and place side marked "fitting" on the fitting and mark center hole.
2. Drill a 1/4" hole into the fitting 2" deep.
3. Place drilling template side marked "rail" on the rail and mark center hole.
4. Drill a 3/8" hole into rail at least 1 1/2" deep.
5. Drill a 1" hole centered on the bottom, 1 1/2" setback.
6. Install rail bolt and plug. Use "vise grips" to insert lag screw end into 2" fitting. Insert machine thread end through oversized hole in the end of the rail. Put nut and washer on bolt through 1" bottom hole and finger tighten, align rail and fitting and finish tightening with 1/2" box end wrench. Sand joint between fitting and rail until you can't feel the joint. Insert taper plug, but do no glue. Tightening may be required later.

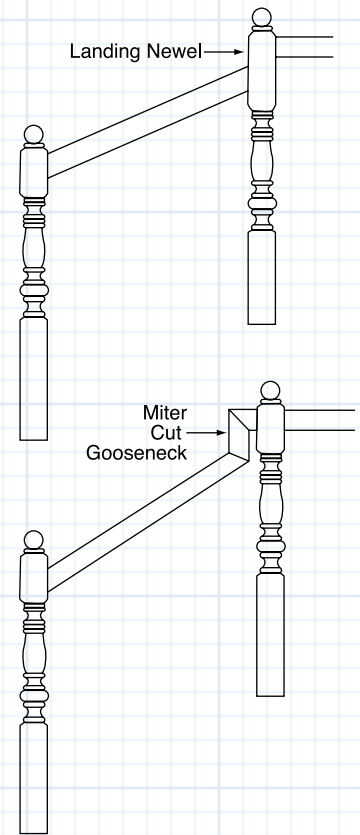
**STEP 9**

**Drill Treads and Rail for Balusters:**

By locating equal centers on the treads, use a level or plumb to locate centers underneath rail. Drill 5/8" holes in treads and rail on the center marks. A speed bore (butterfly) bit is recommended. Drill rail hole approximately 1 1/2" deep so that baluster can be lifted enough to allow dowels to drop into tread holes. Use glue in both holes. Line up bottom squares before glue sets. If square top balusters are used, toe nail the "up" side as shown. Balusters are made to cut up to 3" off the top without changing the sizes.



**STEP 10**



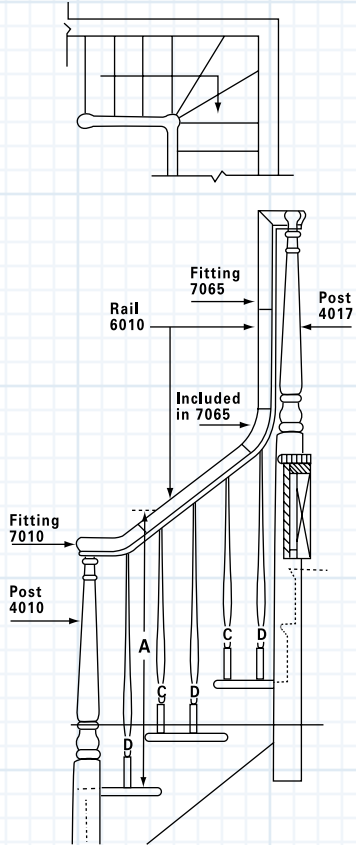
**In Post-to-Post Installations, either:**

1. Use landing newels (with longer square top sections) to make transition from stair rail to landing rail.

**OR**

2. Make rail goosenecks by miter cutting rail as shown (or use stock fittings when using 6010 rails).

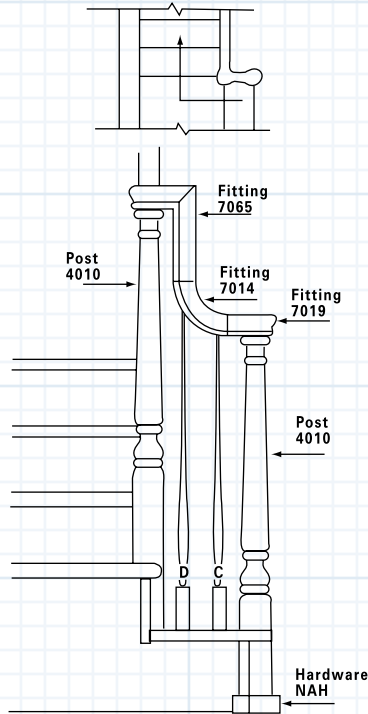
**PLAN A**



**Continuous Rail**

Fitting to 4 riser gooseneck at a 3 pie 90° landing. The gooseneck fitting has the bottom easing unattached to add a piece of rail.

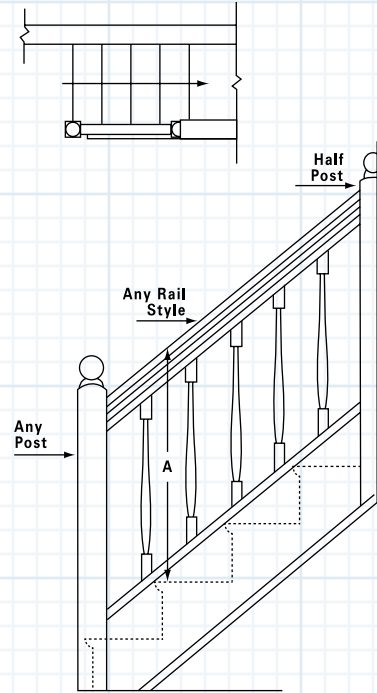
**PLAN B**



**Continuous Rail**

By using a combination of fittings to go up one step to a landing and turning 90° to continue up.

**PLAN D**



**Newel to 1/2 Newel / Rail**

Shoe and fillet are set on top of the exposed boxed stringer. Heavier rail and balusters are usually used.

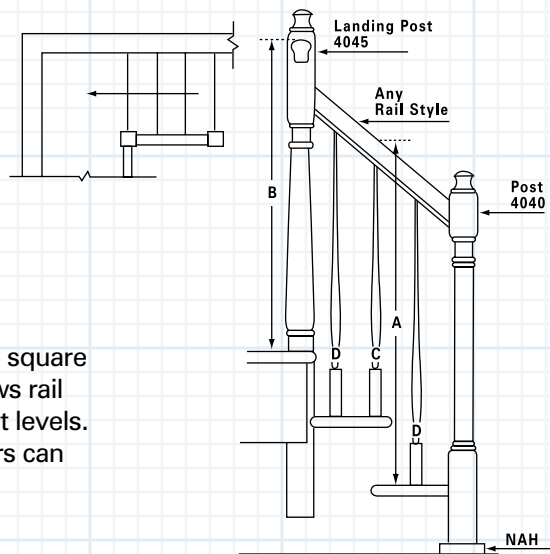
**PLAN C**

*This plan relates to Step 10 in Guidelines for Stairway Installation.*

**Post to Post using Landing Newel**

**Newel to Newel Rail**

Notice how the longer top square on the landing newel allows rail to intersect at two different levels. More massive rail balusters can be used.

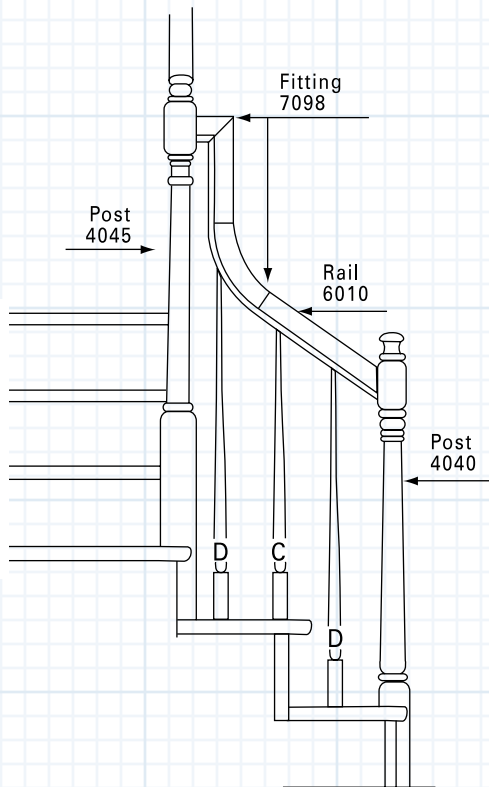
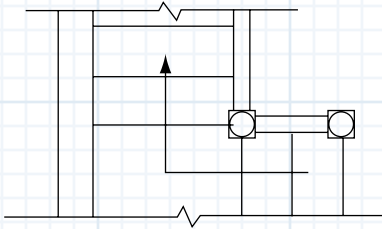


**PLAN E**

*This plan relates to Step 10 in Guidelines for Stairway Installation.*

**Newel to Newel Rail**

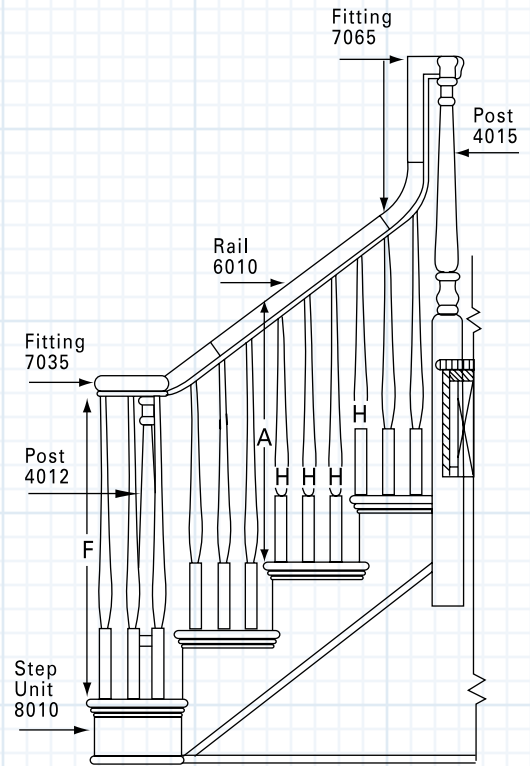
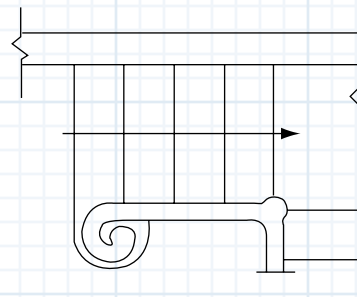
The gooseneck fitting allows adjustment so that top squares on the newels can be the same size.



**PLAN F**

**Continuous Rail**

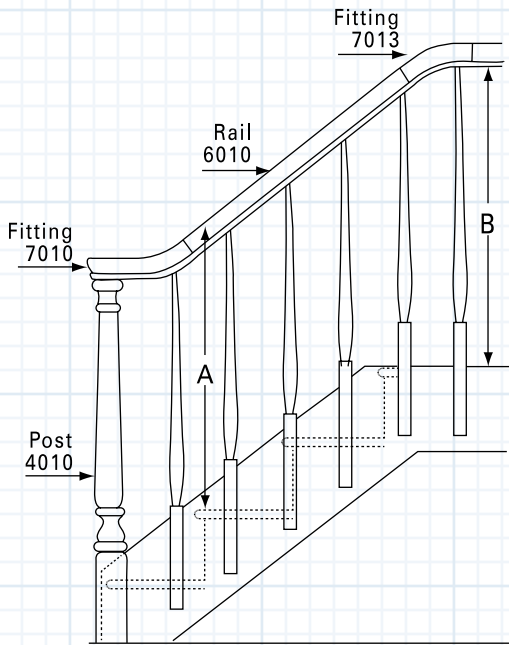
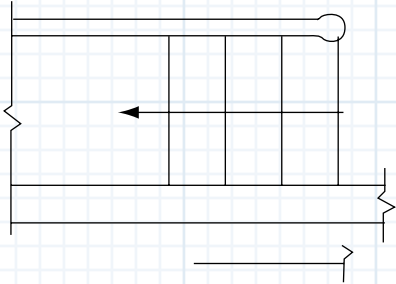
Volute to a gooseneck at a landing and making a 90° turn. The gooseneck with the bottom easing unattached makes it easy to adjust varying rail heights. When 3 balusters per tread are required, use only 1 1/4" and taper top balusters.



**PLAN G**

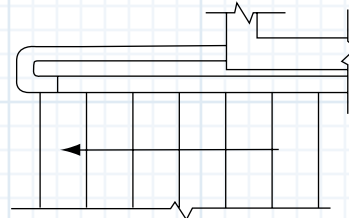
**Continuous Rail**

Starting easing to an overeasing for a graceful free flow effect. Note how balusters anchor to skirt board giving the structural requirements. Use longer length balusters.



**PLAN H**

Continuous rail to the 2nd floor and returning 180°. A fitting designed for a newel should be used if the level rail is more than 4 feet long.



Optional 180° fitting for a newel  
7095 W/C

