

Assembly Instructions

Hollaender
Your Handrail Source.

10285 Wayne Ave. • Cincinnati, OH 45215-6399
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www.hollaender.com

Interna-Rail®



Handrail systems utilizing Interna-Rail "in-line" fittings provide a sleek architectural finish with anodized fittings and aluminum pipe. Interna-Rail has the clean look of welded rail with all the benefits of a mechanical system. Interna-Rail systems can be designed to meet any building code and are constructed of anodized aluminum and stainless steel hardware for corrosion resistance. Systems are shipped either completely assembled in panels, or sub assembled - posts assembled with fittings, pipe shipped separately for final assembly on site.

Tools Needed:

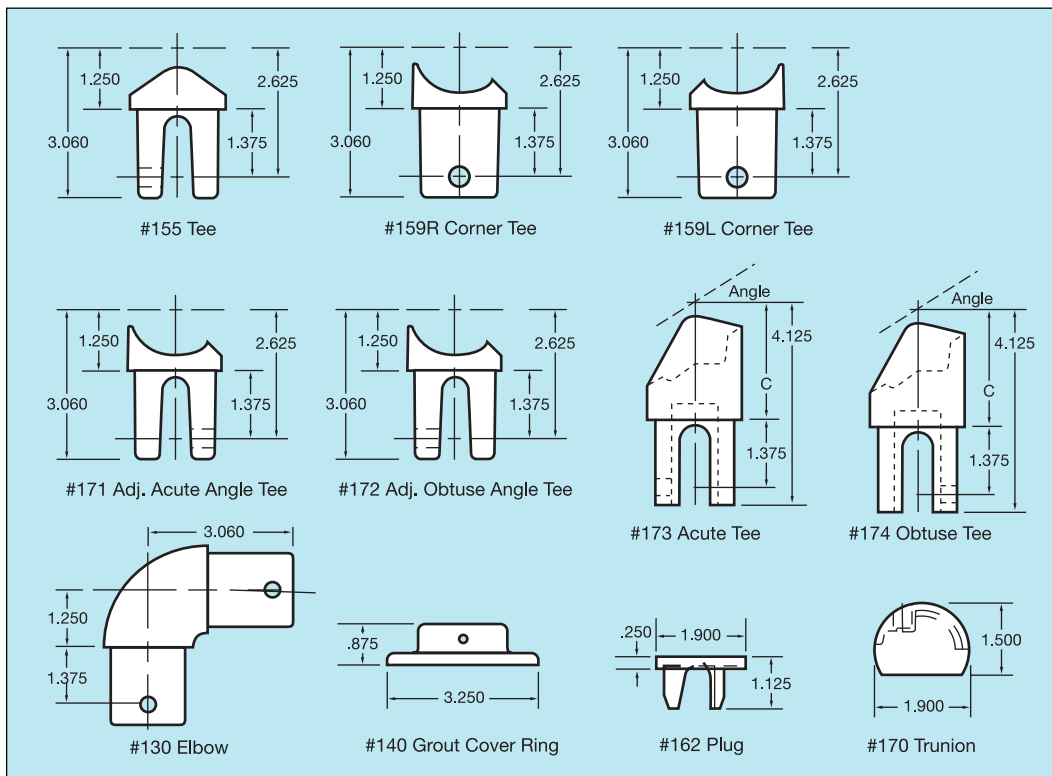
- Tape Measure
- Chalk Line
- Portable Chop Saw
- Apex Bit Holder with 3/16" Bit
- 3/8" Ratchet
- Drill with 27/64" Drill Bit








A Rivet Nut Tool is also necessary to fabricate Interna-Rail. A wide range of these tools are available, please contact us at Hollaender to determine which is best suited for your particular application.

Section A

Interna-Rail Components



Hardware

-  3/8"-16 UNC Stainless Steel Set Screw with Reverse Knurl Cup
-  5/16"-18 UNC Tubular Rivet Nut
-  5/16"-18 UNC Socket Head Cap Screw
-  5/16"-18 UNC Square Nut
-  5/16" High Collar Washer

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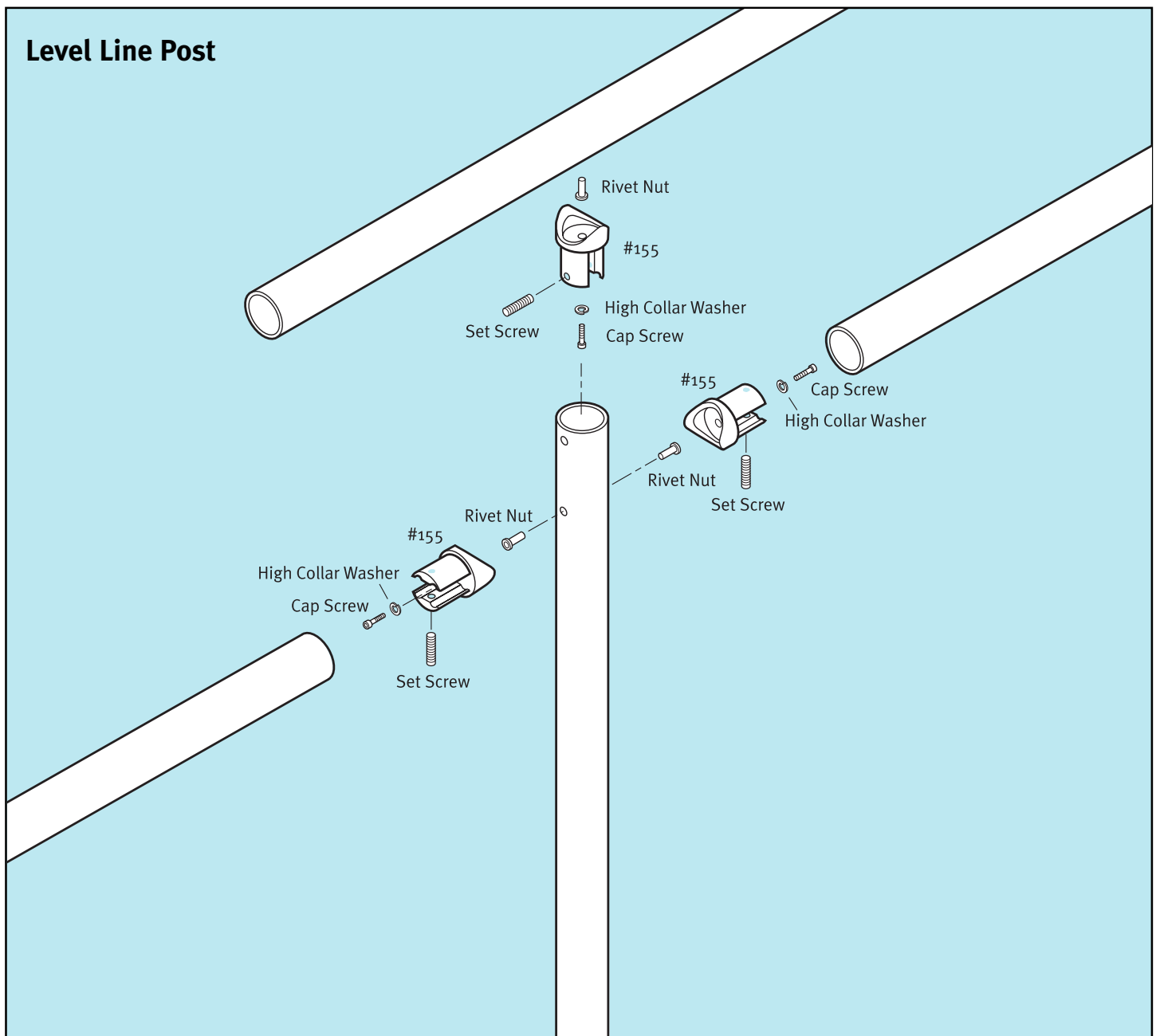
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Section B

Post Assembly Details

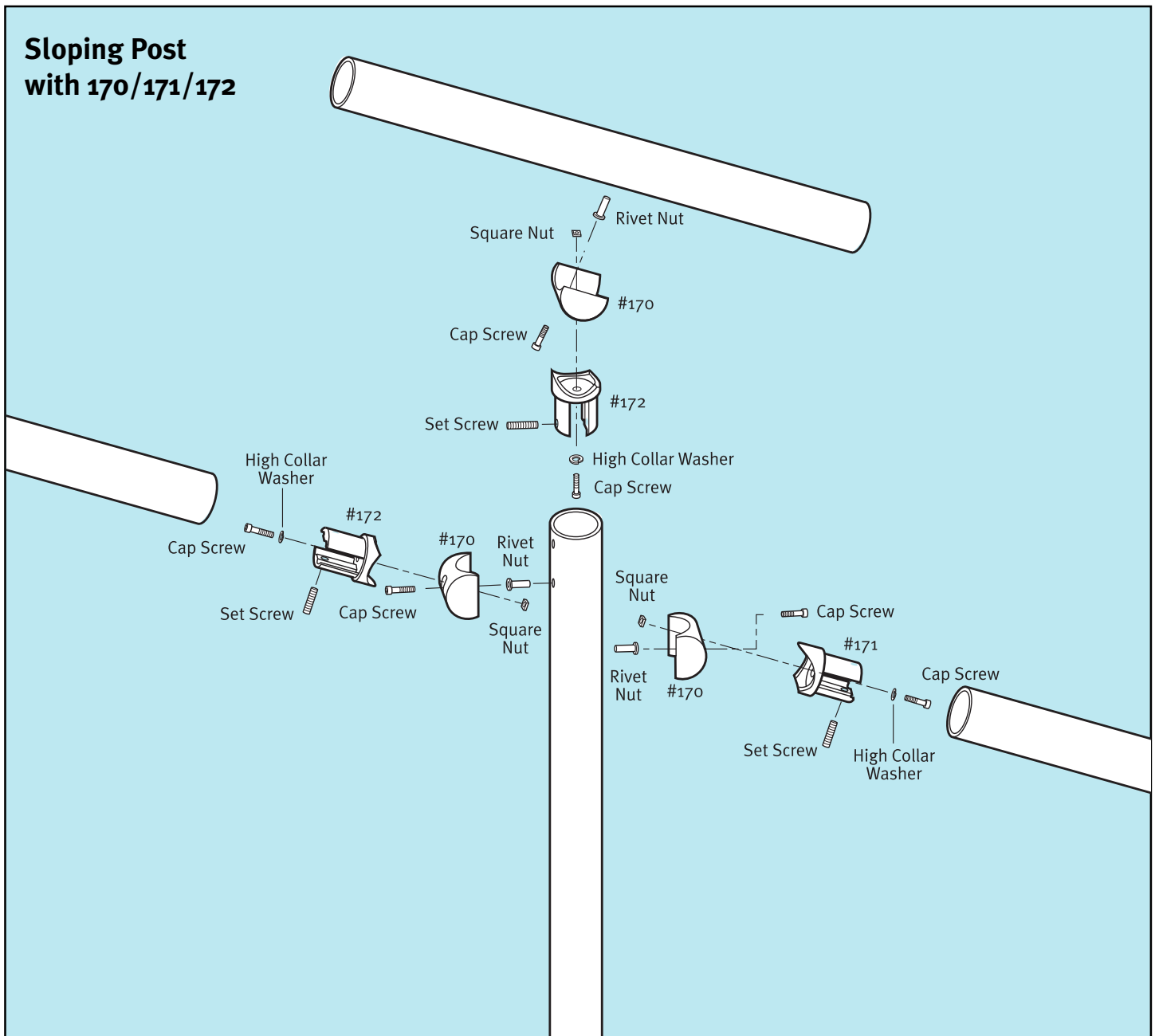


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Section B

Post Assembly Details



Assembly Instructions

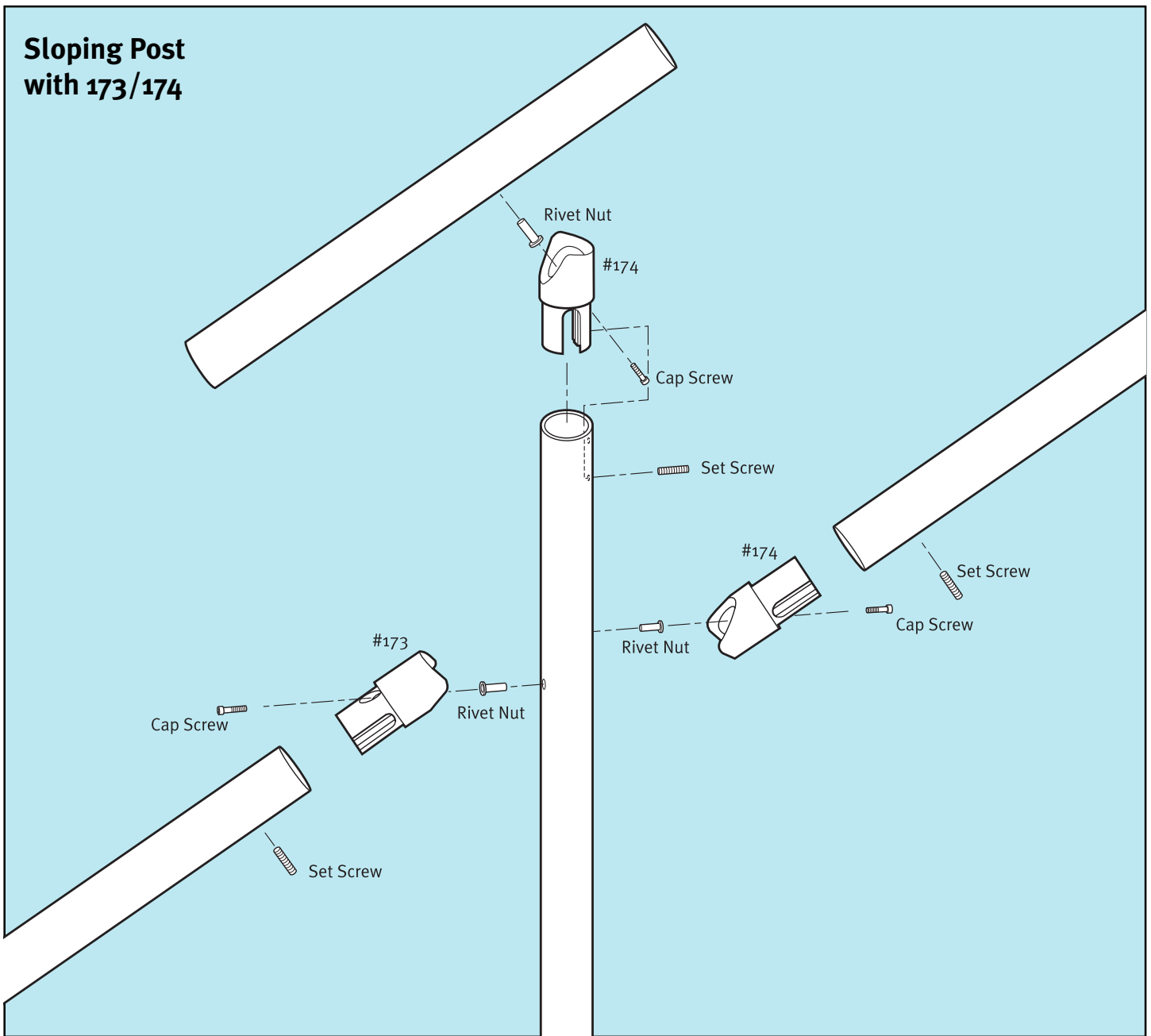
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Section B

Post Assembly Details

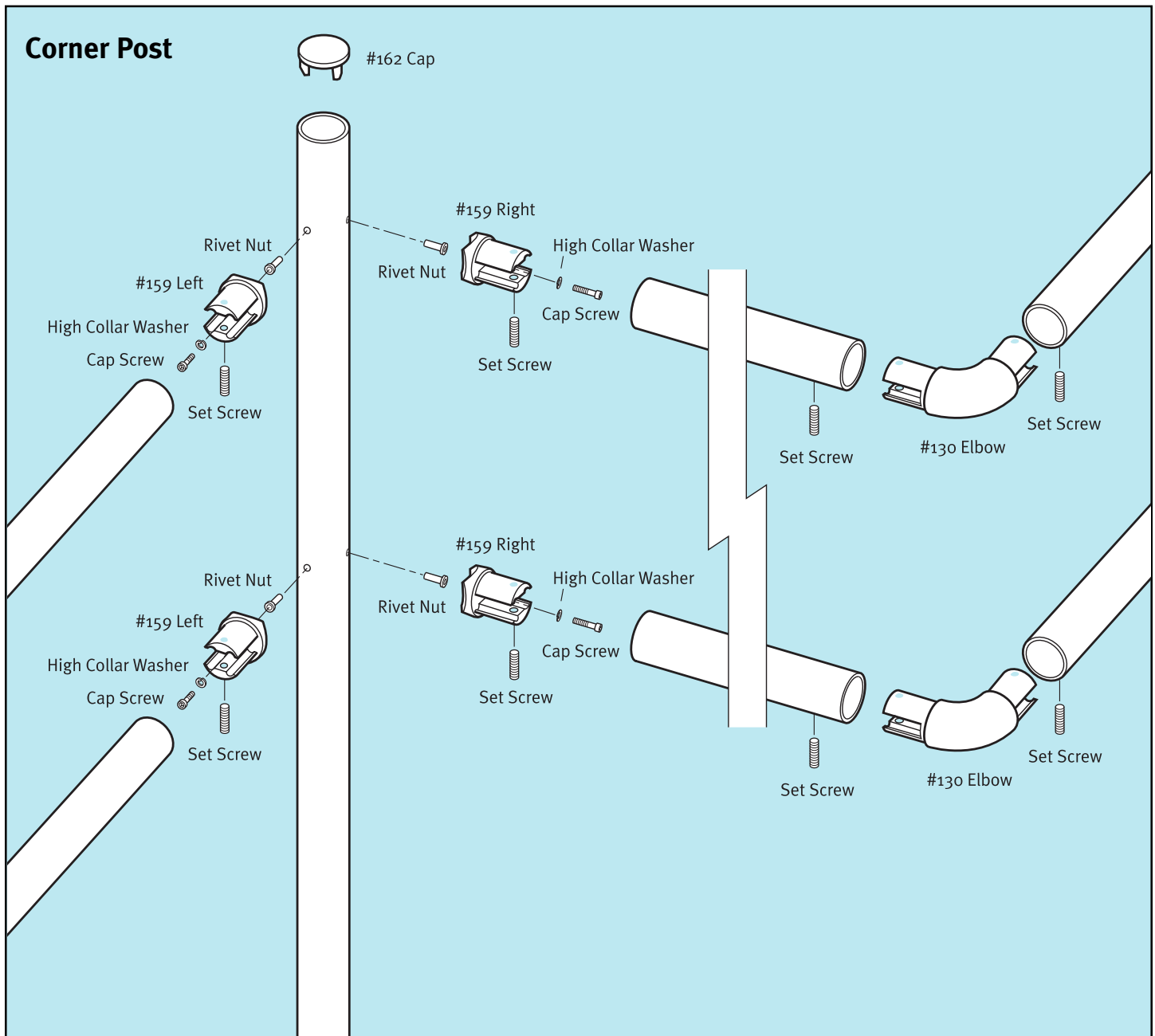


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Section B

Post Assembly Details



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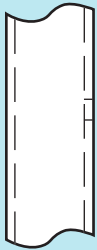
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Section C

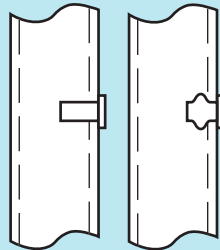
Fitting Attachment Details – Level Handrail

Step 1



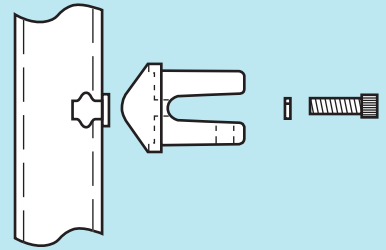
Drill a 27/64" hole in the post.

Step 2



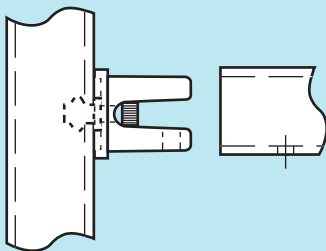
Insert a tubular rivet nut into the hole and crimp using the rivet nut tool.

Step 3



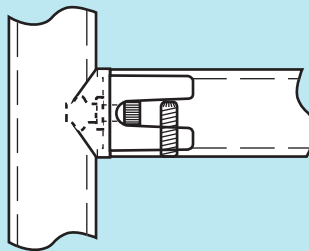
To attach the fitting to the post, insert a socket head cap screw with a washer through the fitting and into the rivet nut. Tighten the cap screw to 16 ft. lbs.

Step 4



Drill a 27/64" hole in the midrail at 1.375" from the end of the pipe. Place the midrail over the ends of the fittings and align the hole in the pipe with the tapped hole in the fitting.

Step 5



Insert a set screw through the hole in the midrail and into the fitting. Tighten the set screw to 22 to 28 ft. lbs.

Same procedure to be used when attaching post to top rail

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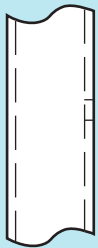
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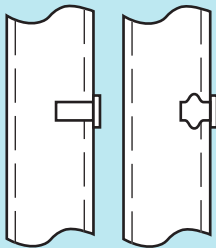
Fitting Attachment Details – Sloping Handrail with 170/171/172

Step 1



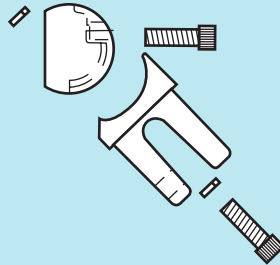
Drill a 27/64" hole in the post.

Step 2



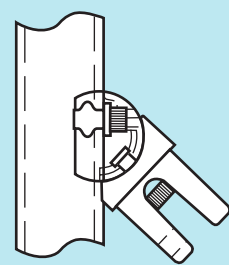
Insert a tubular rivet nut into the hole and crimp using the rivet nut tool.

Step 3



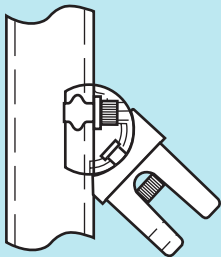
A. Insert cap screw into trunion, loose fit only.
B. Attach the fitting to the trunion using a square nut and a socket head cap screw with a washer, hand tighten only.

Step 4



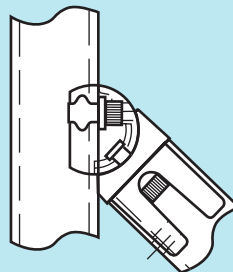
Attach trunion and fitting assembly to post by inserting a cap screw through the trunion and into the rivet nut. Cap screw should be tightened to 16 ft. lbs.

Step 5



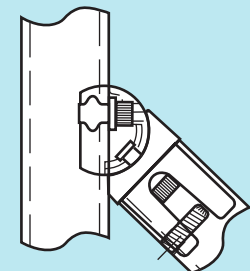
Adjust the fitting to the required angle and tighten the cap screw which holds the fitting in place to 16 ft. lbs.

Step 6



Drill a 27/64" hole in the midrail at 1.375" from the ends of the pipe. Place the midrail over the tines of the fitting and align the hole of the pipe with the tapped hole in the fitting.

Step 7



Insert a set screw through the hole in the midrail and into the fitting. Tighten the set screw to 22 to 28 ft. lbs.

Same procedure to be used when attaching post to top rail

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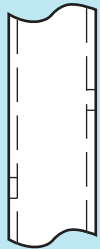
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Section C

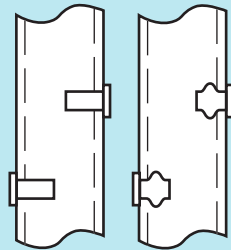
Fitting Attachment Details – Sloping Handrail with 173/174

Step 1



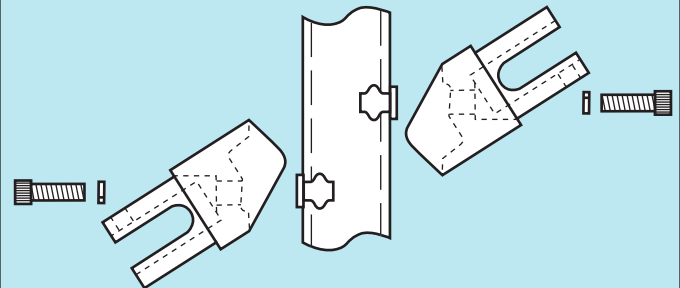
Drill $27/64$ " holes in the post.

Step 2



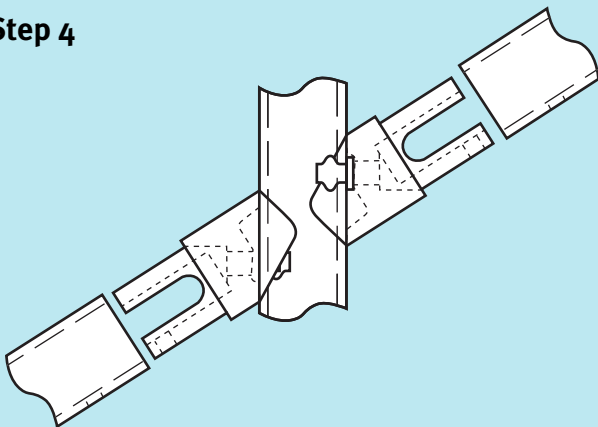
Insert tubular rivet nuts into the holes and crimp using the rivet nut tool.

Step 3



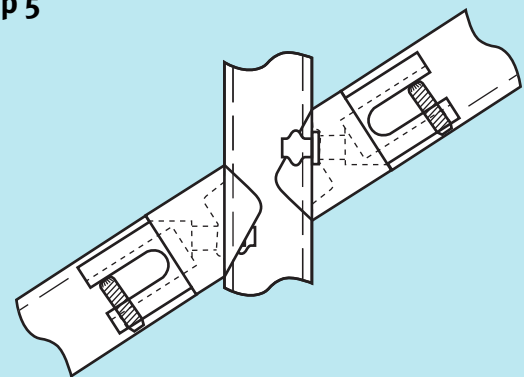
Attach fittings to posts by inserting cap screws through the fittings and into the rivet nuts. Cap screws should be tightened to 16 ft. lbs.

Step 4



Drill $27/64$ " holes in the midrails at 1.375" from the ends of the pipe. Place the midrails over the tines of the fitting and align the holes of the pipes with the tapped holes in the fittings.

Step 5



Insert set screws through the holes in the midrails and into the fittings. Tighten the set screws to 22 to 28 ft. lbs.

Same procedure to be used when attaching posts to top rails

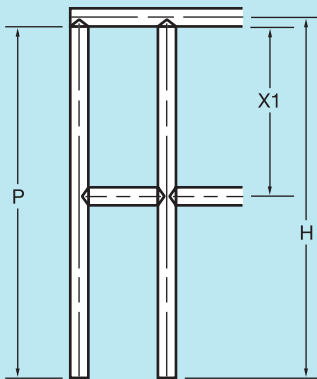
Assembly Instructions

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Section D

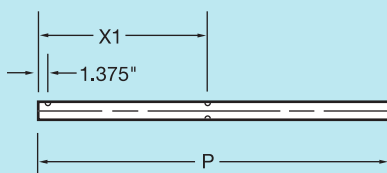
Trim Cutting & Drilling

End Post/Line Post Cut Lengths and Drill Locations



- P** – Height of Post
- H** – Distance from bottom of post to center of top rail
- X1** – Distance from top of post to center of drill for first midrail
(**X2** will represent distance to center of drill for second midrail)

Note: In most cases a distance of 42" from the walking surface to the center of the top rail will be used

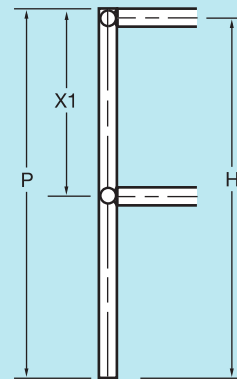


(Drill one side for midrail only on end posts)

- Post cut length: **P = H - 1.250"**
- Drill Locations: Hole drilled at 1.375" to attach top rail
 - Two line system (one midrail)
X1 = 42/2 - 1.250"
 - Three line system (two midrails)
X1 = 42/3 - 1.250"
X2 = (2/3)42 - 1.250"

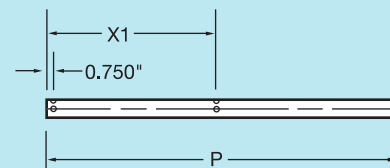
(Drill locations for midrails based on 42" from walking surface to center of top rail)

Corner Post Cut Lengths and Drill Locations



- P** – Height of Post
- H** – Distance from bottom of post to center of top rail
- X1** – Distance from top of post to center of drill for first midrail
(**X2** will represent distance to center of drill for second midrail)

Note: In most cases a distance of 42" from the walking surface to the center of the top rail will be used



- Post cut length: **P = H + 0.750"**
- Drill Locations: Hole drilled at 0.750" to attach top rail
 - Two line system (one midrail)
X1 = 42/2 + 0.750"
 - Three line system (two midrails)
X1 = 42/3 + 0.750"
X2 = (2/3)42 + 0.750"

(Drill locations for midrails based on 42" from walking surface to center of top rail)

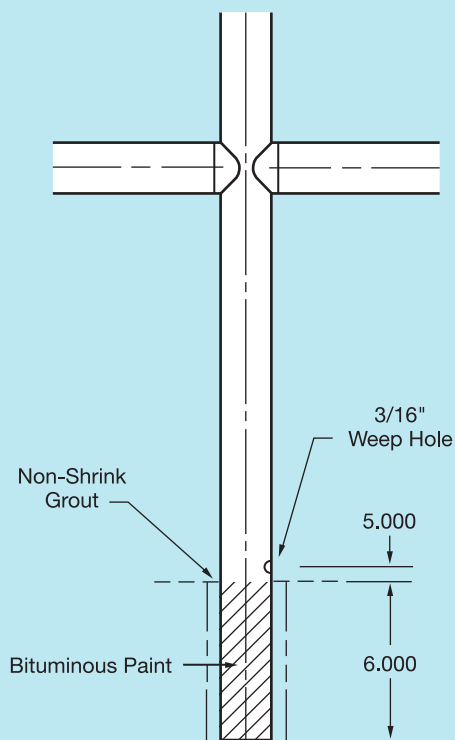
Assembly Instructions

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Section D

Trim Cutting & Drilling

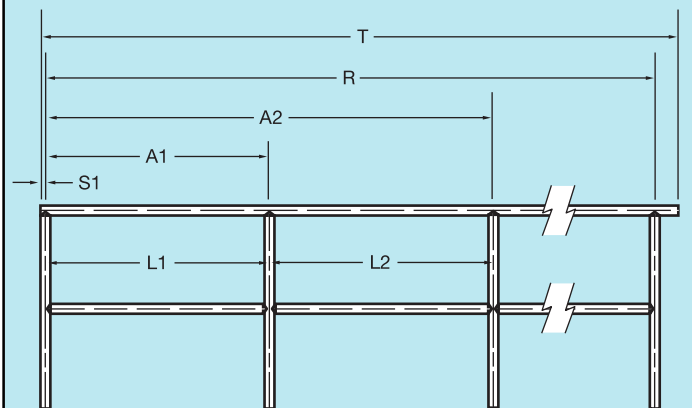
Weep Hole and Bituminous Paint



Posts which have been mounted in a sleeve or a core drilled hole using non-shrink grout should have a weep hole to allow for drainage and a 6" coat of bituminous paint to separate dissimilar materials.

(6" post embedment recommended – minimum to be 4")

Top Rail Cut Lengths and Drill Locations



Reference Dimension: $L_1 + L_2 + L\#$
Top Rail Cut Length: $T = R + P_1 + P_2$
Top Rail Drill Locations: $A_1 = P_1 + L_1$
 $A_2 = A_1 + L_2$
 $A\# = A(\# - 1) + L\#$
Final Drill Location: $A\# = A(\# - 1) + L\# + (P_2 - S_2)$

R – Reference dimension (total of bay lengths in handrail section)
T – Top rail cut length
P₁ – Change in top rail cut length related to first post type
P₂ – Change in top rail cut length related to last post type
L_# – Distance between posts or bay length
A_# – Distance from end of top rail to each drill location after first
S₁ – Distance from beginning of top rail to first drill location
S₂ – Distance from last drill location to end of top rail

Cut length **T** is dependent upon the first and last post types as well as the number and size of bays in handrail section

Drill locations **S₁** and **S₂** are dependent upon the first and last post types

(See next page for **S₁**, **S₂** and **P₁**, **P₂** values)

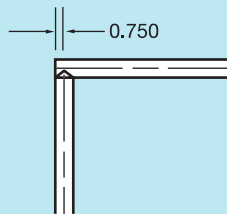
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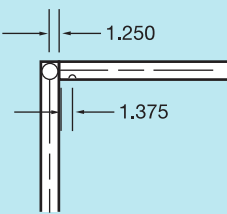
Section D

Trim Cutting & Drilling

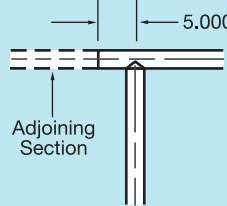
Top Rail Termination Data



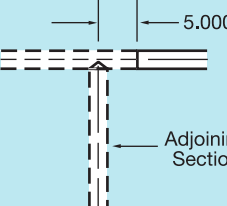
End Post S1, S2 = 0.750
P1, P2 = 0.750



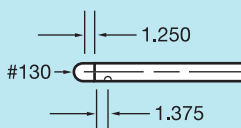
Corner Post S1, S2 = 1.375
P1, P2 = 1.250



Splice S1, S2 = 5.000
P1, P2 = 5.000



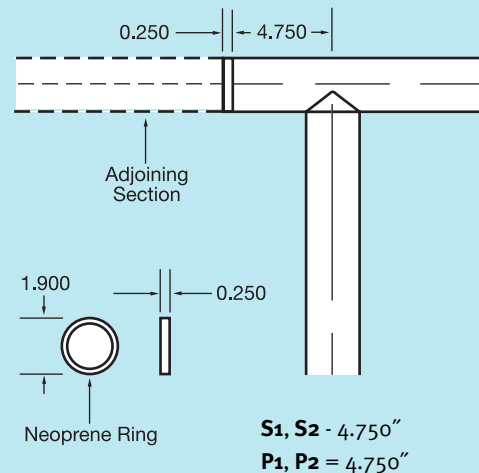
Splice S1, S2 = L1 - 5.000
P1, P2 = - 5.000



Corner with #130 S1, S2 = 1.375
P1, P2 = - 1.250

Expansion and Contraction in Top Rail

Where expansion and contraction in the top rail due to temperature variation is a concern, a .25" gap should be left between the rails when splicing. A neoprene ring may be used to fill this gap.



S1, S2 = 4.750"
P1, P2 = 4.750"

(This assembly is recommended for most outdoor environments)

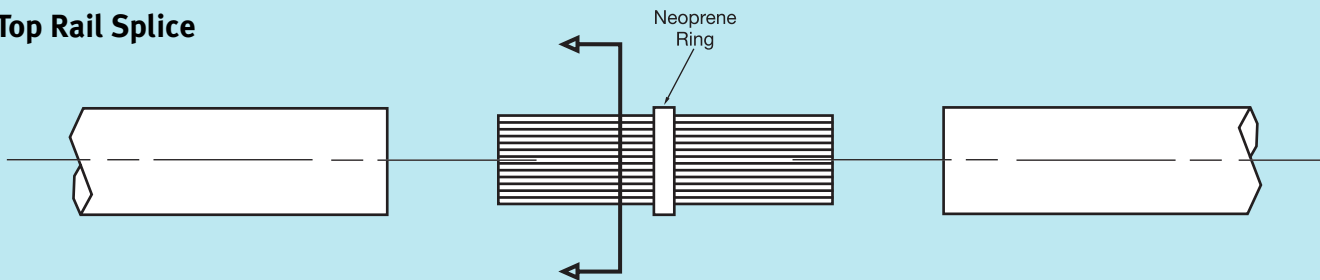
Assembly Instructions

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Section D

Trim Cutting & Drilling

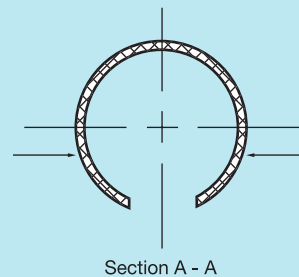
Top Rail Splice



Note: Splice in top rail should be made 5" from the center of the nearest post

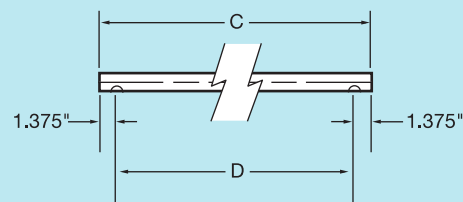
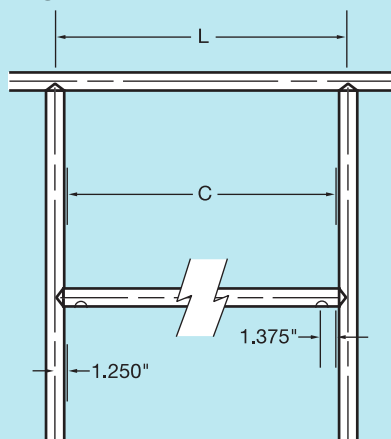
To Install:

1. Apply force at arrows (vice grip recommended)
2. Insert into pipes to be spliced
3. Release force and pull pipes together



Section A - A

Midrail Cut Lengths and Drill Locations



Calculation for cut length: $C = L - 2.500''$

Calculation for distance between drills: $D = C - 2.750''$

Note: Minimum bay length to be 6 1/8"

- L – Distance between posts or bay length
- C – Midrail cut length
- D – Distance between drill location centers

Assembly Instructions

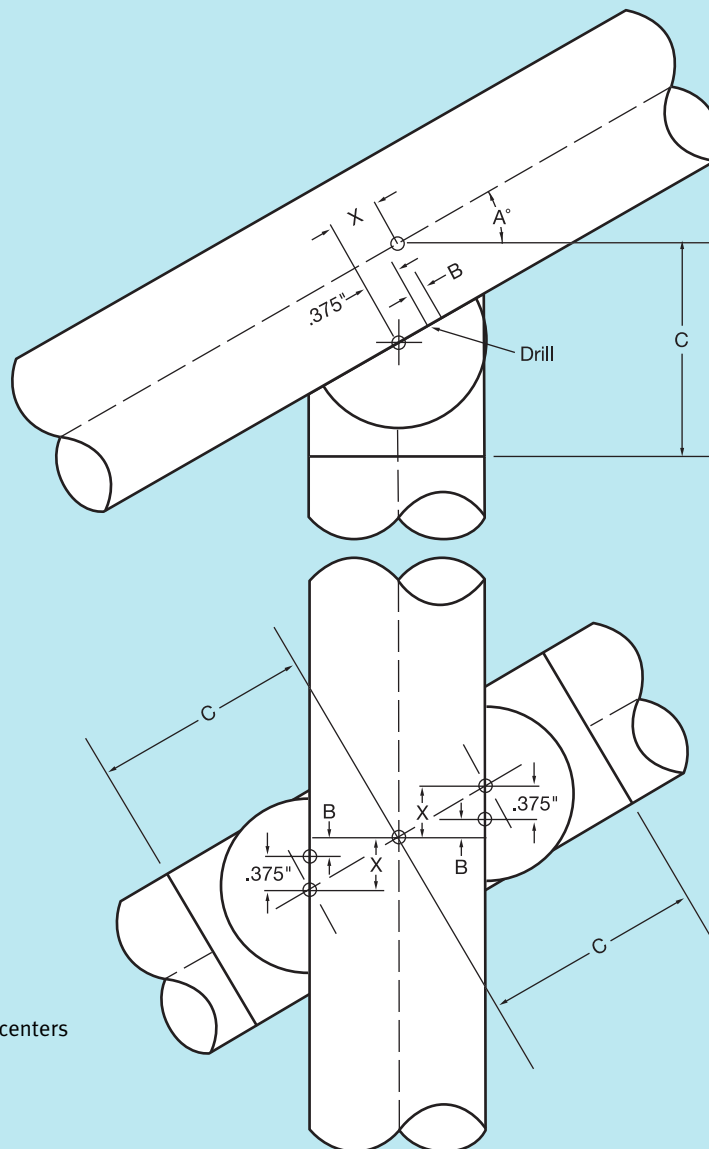
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Section D

Trim Cutting & Drilling with 170/171/172

Sloping Handrail Cut Lengths and Drill Locations

A°	B	X	C
12°	.174	.201	2.22
14°	.138	.256	2.23
16°	.102	.272	2.24
18°	.066	.308	2.25
20°	.029	.345	2.26
22°	.008	.383	2.27
24°	.047	.442	2.28
26°	.088	.463	2.30
28°	.130	.505	2.32
30°	.173	.548	2.34
32°	.218	.593	2.37
34°	.265	.640	2.39
36°	.315	.690	2.42
38°	.367	.742	2.45
40°	.422	.797	2.49
42°	.480	.855	2.52
44°	.542	.917	2.57



- A° – Angle of slope or rake
- B – Variation of intersecting centerlines to riv-sert centers
- C – Length to be deducted from post and rail
- O – Datum
- X – Variation on intersecting centerlines

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Section D

Trim Cutting & Drilling with 173/174

Sloping Handrail Cut Lengths and Drill Locations

A°	B	X	C
5°	.000	.083	1.336
18°	.316	.309	1.976
29°	.136	.527	2.373
32°	.304	.594	2.422
35°	.377	.665	2.481
38°	.431	.742	2.552

- A° – Angle of slope or rake
- B – Variation of intersecting centerlines to riv-sert centers
- C – Length to be deducted from post and rail
- X – Variation on intersecting centerlines

