

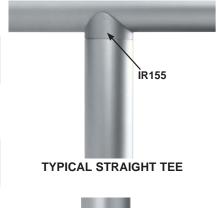
GLASS RAILING

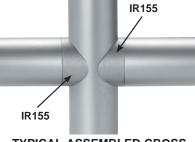


SPIRAL STAIF



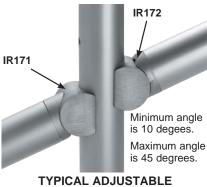






TYPICAL ASSEMBLED CROSS Assemble with *Through Bolt* – *IR78212, IR7813* or *9578B*.



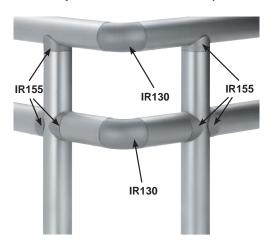


ANGLE CROSS

INTERNA-RAIL® NON-WELD PIPE RAILING SYSTEM

For applications which require a sleek architectural design and finish.

- Appearance Design of Interna-Rail® combines the clean look of welded rail with all the benefits of a mechanical system.
- Strength *Interna-Rail*® can be designed to meet any building code. Please refer to the structural test data shown on pages 80 to 81.
- Corrosion Resistance All Interna-Rail® aluminum fittings are supplied with a AA-M10-C22-A41 (215-R1) anodized finish which provides additional resistance to corrosion and staining. The hardware supplied with the product is stainless steel. Mill finish fittings are also available.
- Durability The double tang set screw activated design provides a virtually maintenance free system which is inherently longer lasting than those which utilize adhesives and pop rivets.
- Assembly Details Download assembly details from our website.





CORNER ELBOW ASSEMBLY

ADA Compliant Railings

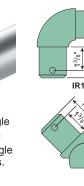
Interna-Rail® is designed to meet the requirements of the Americans with Disabilities Act.

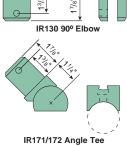
- Handrail Bracket IR85 can be rotated to any angle for ramps or stairs.
- Provides for 1½" clearance between handrail and post or wall.
- The underslung, rounded design creates a continuous gripping surface with no sharp edges.
- System can be supplied mill, anodized or powder coated.
- End loops, wall returns, flanges, elbows, splices and tangent bends are available.

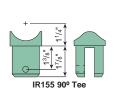


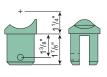
END POST WITH CAP

All assemblies are comprised of these basic components.

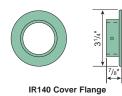








IR159 90° Corner Tee

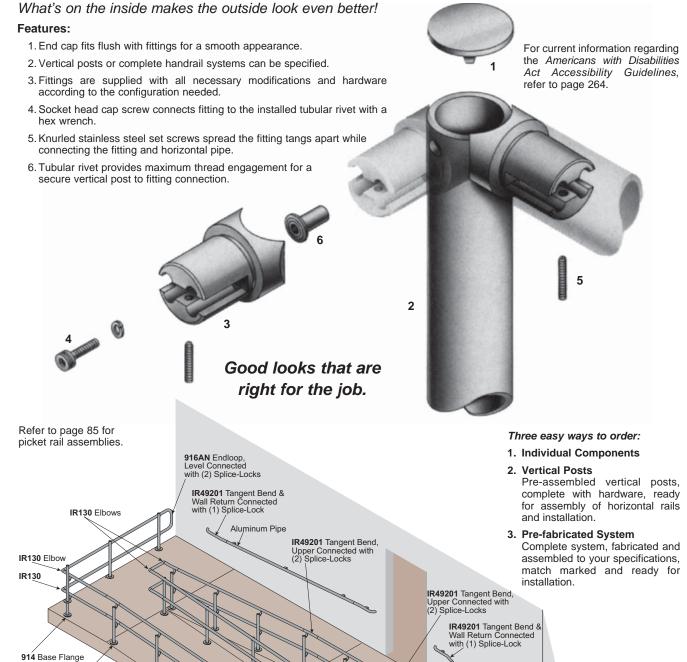




.Wall Bracket

914 Base with 915 Wedge

Offset Sloping Line Post with (2) IR85 Adjustable Offset Handrail Bracket and IR162



Offset Level Line Post with (2) IR85 Adjustable Offset Handrail Bracket and IR62 End Cap

Endloop, Lower / Connected with (2) Splice-Locks



INTERNA-RAIL® PIPE RAILING SYSTEM

- All fittings on these pages are for use with 1½" schedule 40 aluminum pipe, unless noted.
- For additional strength, use schedule 80 pipe and tees for posts or solid dowel insert with schedule 40 pipe.
- Pipe is supplied with a clear anodized, 204-R1 finish.
- Fittings are supplied with a clear anodized, 215-R1 finish.
- Pre-assembled vertical posts can be purchased and shipped with fittings in place.



90° ELBOW

	Cast Aluminum
Schedule 40	IR130
For other available elbows a	nd angles, go
to pages 172 to 187.	



90º TEE

	Cast Aluminum
Schedule 40	IR155
Schedule 80	IR158



ACUTE ANGLE TEE

/ 100 1 = / 1110		
Schedule	Angle Range	Cast Aluminum
Schedule 40	3°-5°	IR173.4
Schedule 40	17°-19°	IR173.18
Schedule 40	28°-30°	IR173.29
Schedule 40	31°-33°	IR173.32
Schedule 40	34°-36°	IR173.35
Schedule 40	37°-39°	IR173.38
Schedule 80	3°-5°	IR178.4
Schedule 80	17°-19°	IR178.18
Schedule 80	28°-30°	IR178.29
Schedule 80	31°-33°	IR178.32
Schedule 80	34°-36°	IR178.35
Schedule 80	37°-39°	IR178.38



90° CORNER TEE (set of two)

	Cast Aluminum
Schedule 40	IR159
Schedule 80	IR159.80



CROSS

	Cast Alumin
Set of two IR155 90° Tees.	IR157

Bolts and threaded rivets not included; order separately (page 77) or you may use a through bolt with lock washer and nut.



ADJUSTABLE OBTUSE ANGLE TEE

Cast Aluminum

Schedule 40 IR172

May be adjusted to stair or ramp angle as needed. Contains Tee and Trunion fittings and hardware.



OBTUSE ANGLE TEE

Schedule	Angle Range	Cast Aluminum
Schedule 40	3°-5°	IR174.4
Schedule 40	17°-19°	IR174.18
Schedule 40	28°-30°	IR174.29
Schedule 40	31°-33°	IR174.32
Schedule 40	34°-36°	IR174.35
Schedule 40	37°-39°	IR174.38
Schedule 80	3°-5°	IR179.4
Schedule 80	17°-19°	IR179.18
Schedule 80	28°-30°	IR179.29
Schedule 80	31°-33°	IR179.32
Schedule 80	34°-36°	IR179.35
Schedule 80	37°-39°	IR179.38



END CAP

	Cast Aluminum
Schedule 40	IR162
Schedule 80	IR162.80
For other available end caps	, go to pages
206 to 209.	



ADJUSTABLE ACUTE ANGLE TEE

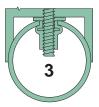
Cast Aluminum

Schedule 40 IR171

May be adjusted to stair or ramp angle as needed. Minimum angle is 10°. Maximum angle is 45°. Contains Tee and Trunion fittings and hardware.



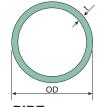




- 1. After drilling 27/64" diameter hole, tubular rivet is inserted.
- 2. A rivet setting tool is then used to crimp the rivet inside the pipe wall.
- 3. Once in position, the fitting is connected to the vertical pipe with the use of a socket head cap screw.



- · May be purchased as individual fittings and pipe or assembled components.
- Designed to allow for easy site assembly and installation of handrail on both new construction or alterations.
- All hardware is stainless steel and anodized aluminum.



The solid dowel is inserted into Schedule

40 pipe posts to

increase the system's load bearing ability.

Schedule 40 pipe is suitable for use as horizontal railing or vertical posts. To increase a railing's load bearing ability, use schedule 80 pipe in fabricating your vertical post assemblies or use schedule 40 pipe in combination with the IR93200 Solid Dowel.

PIPE

					6063-T6	6063-T6 Satin
Pipe					Anodized	Anodized
Size	Sch.	OD	ID	t	Aluminum	Aluminum
11/2"	40	1.900"	1.610"	.145"	P560	P565
11/2"	80	1.900"	1.500"	.200"	P582	P585





For other available flanges, go to pages 188 to 203.

COVER FLANGE

Aluminum 1477



SOLID DOWEL

Aluminum IR93200



SINGLE LOCK SPLICE-LOCK™

Length	Alumir	St	ainie	ess	
3¾"	3319		3321		1
6"	3345		3349		9
Single-Lock.	Go to	page	169	to	view
Double-Lock	Splice	Lock	s ar	nd	other
available conne	ectors.				

SET SCREW	Stainless
3/8 - 16 × 1 ⁷ / ₁₆ "	IR81913
THROUGH BOLT	Stainless
5/16 - 18 Square Nut	IR78212
5/16 - 18 x 31/4" Socket Head Cap Screw	IR7813
Lock Washer for 5/16" Bolt	9572B



INSERT COUPLING

		Extruded
Pipe Size	Tube OD	Aluminum
11/2"	1.900"	SA517
5" Long		

Friction fit. Set in place with Epoxy.



3M™ SCOTCH-WELD™ EPOXY

Applicator Gun with Plunger, 1 50 ml Epoxy and 2 Tips	EPX100
1 50ml Epoxy Cartridge Refill and 2 Tips	EPX100R
Plunger	EPX100P



Curtis • Shipping



POST BRACKET

Meets ADA and ANSI requirements for minimum clearances. May be rotated to any angle. Go to pages 142 to 156 for other brackets.

	Cast Aluminum
Clear Anodized	IR85KA
Tumbled Mill	IR85KM-87
• Handrail bracket IR85 can	be rotated to

- any angle for ramps or stairs. Provides for 1½" clearance between
- handrail and post or wall.
- Mounts with 5/16" button head bolt and threaded rivet which are provided.



TOE BOARD EXTRUDED OFFSET **BRACKET**

Aluminum IR28610



1" Wide Aluminum

TOE BOARD CORNER SPLICE

Aluminum IR28526



TOE BOARD BRACKET

Aluminum

IR28576



TOE BOARD CLAMP

Aluminum IR28546

Interna-Rail® is designed to meet the requirements of the Americans with Disabilities Act and ANSI A117.1. Refer to page 264 for information on ADAAG requirements.



Rob • Engineering



TOE BOARD BRACKET

Aluminum IR28250



TOE BOARD BRACKET

Aluminum



Tom • Sales



FLANGE

- 1/2" Thick
- 5" x 5" base
- 3" high • Four 7/16" holes

Aluminum SR45SBC-8



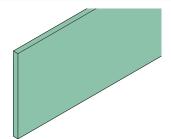
4" BEVELED TOEPLATE

Aluminum IR94102 24' Lengths



TOE BOARD SPLICE

Aluminum IR28536



TOE BOARD Mill Finish; 16' Lengths

Cast Aluminum
1/4" × 4"

B20340



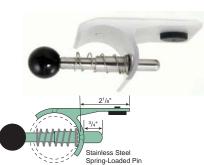
TOE BOARD CLIP

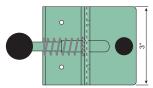
Mill Finish

Aluminum

IR0363







GATE LATCH & STOP

Cast Aluminum IR101



EXTRA HEAVY DUTY FASCIA FLANGE

1%" to center of post Four 11/16" × 13%" slots

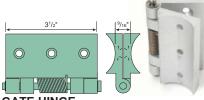
Thickness	Height	Width	Cast Aluminun
⁷ / ₁₆ "	8"	6"	SR52HD-8



ROUND WALL FLANGE

 $\%_{16}$ " x 1" slot at center for wall mount holes

Thickness	Height	Width	Cast Aluminum
5/16"	29/16"	3¾"	SR43-8



GATE HINGE

Supplied in sets of two – both with springs. Fasten with $\mbox{${\cal Y}$}$ -20 × $\mbox{${\cal Y}$}$ " Stainless Steel Flat Head Machine Screws not included.

	Cast Aluminur
Six 1/4" holes	IR100



EXTRUDED FASCIA FLANGE

111/32" to center of post Four 7/16" holes

Includes rubber gasket for mounting

HIGHHICOG	rioigiit	* * I G ti I	7 ((0))
3/8"	5"	5"	SR52E-8



HEAVY DUTY RECTANGULAR BASE FLANGE

Four %6" holes for ½" mounting bolts

T1 1 1			6
Thickness	Height	Base	Cast Aluminum
9/16"	31/2"	6" × 7½"	SR48BC-8



ROUND FLOOR FLANGE

Four 7/16" holes

	0.00		
Thickness	Height	Base Diam.	Cast Aluminum
3/8"	25/16"	41/2"	SR42-8





Neil • Quality



Keri • Marketing



Angel • Polishing

INTERNA-RAIL

Interna-Rail® is uniquely designed for easy assembly and superior strength. The all-mechanical assembly requires **no welding.**

TEE CONNECTIONS:

Interna-Rail's tee connections feature a threaded, tubular rivet that provides a more substantial thread engagement between the bolt and post.

SPLICE CONNECTIONS:

Splice connections make use of a set screw that tightens through the pipe wall and component to spread the fitting tangs. The combined strength of the screw, connecting the fitting to the pipe, and the expansion of the tangs, firmly secures the fitting to the pipe.

FITTINGS

Interna-Rail® fittings are cast of corrosion-resistant, aluminum/magnesium alloy. When combined with stainless steel connectors, this system is an excellent choice for any industrial or architectural application in virtually any environment or climate.

FINISH:

Interna-Rail's smooth, continuous surface gives any railing application an attractive, streamlined appearance. The standard finish on all *Interna-Rail®* fittings is clear anodized. Other architectural finishes, as well as in-fill panels are also available. Contact **Wagner** for more information about these and other options available to you.

HARDWARE:

Unlike other railing systems, every *Interna-Rail*® assembly comes complete with *all* of the necessary hardware. This is true whether you specify vertical posts or pre-fabricated systems. Specify *Interna-Rail*® to suit your application. Surface mounting hardware is not included; order separately.

FABRICATION:

To assist you in selecting the best method of assembly for your application, **Wagner** can supply you with a list of qualified fabricators in your area or supply fabricated, pre-finished railings per your specifications. Contact **Wagner** with your requirements.

ASSEMBLY:

View assembly details at www.wagnercompanies.com

INTERNA-RAIL TEST DATA

Based on 11/2" Schedule 40 Aluminum Pipe

The Pittsburgh Testing Laboratory conducted tests on the *Interna-Rail*® System. The results far exceed OSHA side load requirements as well as a wide range of regional and local regulations. The tests were performed on 12" high handrail assemblies and 42" high single posts. While all of the tests used 1½" IPS schedule 40 aluminum pipe, the alloy temper, type of mounting and reinforcement were varied. Test results are detailed on the chart below.

	Rail Assembly			Single Post				
	No Réin	6063-T6 forcement Flange	Alloy 6061-T6 No Reinforcement Wall Flange		Alloy 6061-T6 20" Reinforcement Wall Flange		Alloy 6061-T6 12" Reinforcement Wall Flange	
Load	Deflect.	Perm. Set	Deflect.	Perm. Set	Deflect	Perm. Set	Deflect.	Perm. Set
200	.84"	.00"	.56"	.00"	.81"	.00"	1.22"	.00"
250	1.47"	.00"	.91"	.00"	1.31"	.00"	1.53"	.00"
300	2.31"	.00"	1.28"	.00"	1.81"	.00"	1.90"	.00"
350	2.72"	.00"	1.62"	.00"	2.34"	.00"	2.40"	.00"
400	3.31"	.00"	2.00"	.00"	3.82"	.00"	2.84"	.00"
450	4.09"	.09"	2.47"	.00"	4.07"	.53"	3.34"	.00"
500			3.03"	.00"			4.26"	.16"
550			3.40"	.00"				
600			3.84"	.00"				
650			4.31"	.00"				
700			4.88"	.25"				

These results exceed OSHA side load requirements.

Test results show that, when fabricated and installed properly, *Interna-Rail*® exceeds OSHA side load requirements listed in *OSHA General Industry Standards*, 29 CFR 1910.23, Chapter XVII, paragraph (5) (iv) for pipe railings, revised publication date November 7, 1978, as follows:

The mounting of handrails shall be such that the completed structure is capable of withstanding a load of at least 200 pounds applied in any direction, at any point on the top rail.

.326 in³

.412 in³



Ron • Bending

Contact Wagner regarding fabricated tube railings.

RAILING FORMULAS

The following railing formulas may be used to determine maximum post spacing under a uniform load and stress at the base of the post under a concentrated load. Consult your local code to determine your structural requirements.

Uniform Load:

$$L = \frac{f_s \times S}{w/12 \times h}$$

Result will provide you with the maximum allowable span between the post centerlines.

Concentrated Load:

$$f = \frac{F \times h}{S}$$

Result will provide you with the stress at the base of the post. Compare to *Allowable Stress* for the aluminum alloy to determine it's suitability.

 $\begin{array}{lll} L &= \mbox{Span between centerline} & \mbox{S} &= \mbox{Section Modulus (in}^3) \\ & \mbox{of posts (inches)} & \mbox{w} &= \mbox{Uniform Load (lb/ft)} \\ f &= \mbox{Uniform Load (lb/ft)} \\ f_{\mbox{S}} &= \mbox{Allowable Stress (psi)} & \mbox{h} &= \mbox{Post Height (inches)} \\ \end{array}$

Load Distribution:

11/2"

11/2"

40

80

In pipe railing load distribution is fairly uniform. On railings having two or fewer spans, multiply the concentrated load (F) by .85 for end posts and .65 for intermediate posts. On railings having three or more spans, multiply the concentrated load (F) by .84 for end posts and .60 for intermediate posts.

Aluminum A	-	llowable Stress (psi)	Minimum Yields (psi)	Modulus of Elasticity (psi x 10°)
6061-T6 F	Pipe	24,000	35,000	10.0
6063-T6 F	Pipe	18,000	25,000	10.0
Dina Siza	Sahadul	Outside	Inside	Section Well Modulus

For current information regarding the *Americans with Disabilities Act Accessibility Guidelines*, refer to page 264.

1.610"

1.500"

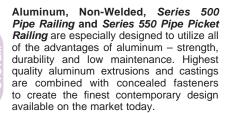
.145"

.200"

1.900"

1.900"





Components are easily assembled - without welding - using mechanical fasteners at intersections and epoxy structural adhesive at splice joints.

Series 500 and 550 Railings are also available as factory assembled units that are made to your exact specifications. This will result in further on-site fabrication savings. Special curves or pipe radii can easily be fabricated to fit your job.

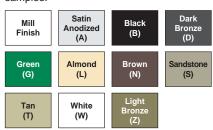
Posts and top rails are assembled to run in continuous lengths creating a system that is stronger than one with cast tee and cross connections, and it provides a continuously smooth top rail surface. The Series 550 Pickets are factory assembled with a tight drive-in-fit to the top and bottom rails that assures squareness and rigidity. Preassembled sections up to 24 feet can be shipped factory-assembled or knocked down for reassembly.

Series 500 and Series 550 are available in 11/2", Schedule 40 pipe size - 1.900" outside diameter with a .145" wall thickness. Standard heights are 32", 36", 42" or 48" with custom heights available upon request.

practical, sound investment for the budget-minded buyer.

Finishes:

Your choice of satin anodized or baked-on enamel. These samples are for comparison only. Contact Wagner for actual color samples.







11/2" SCHEDULE 40 PIPE

24' Lengths

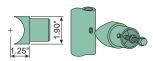
z i zongino			
Color	OD	t	Aluminum
Aluminum	1.900"	.145"	SA500
Satin Anodized	1.900"	.145"	SA500A
Black	1.900"	.145"	SA500B
Dark Bronze	1.900"	.145"	SA500D
Green	1.900"	.145"	SA500G
Almond	1.900"	.145"	SA500L
Brown	1.900"	.145"	SA500N
Sandstone	1.900"	.145"	SA500S
Tan	1.900"	.145"	SA500T
White	1.900"	.145"	SA500W
Light Bronze	1.900"	.145"	SA500Z
•			





ANGLE TEE

Color	Aluminum
Aluminum	SA504
Satin Anodized	SA504A
Black	SA504B
Dark Bronze	SA504D
Green	SA504G
Almond	SA504L
Brown	SA504N
Sandstone	SA504S
Tan	SA504T
White	SA504W
Light Bronze	SA504Z



90° TEE

Self-tapping fastener inlcuded. Order SA526 throughbolt for cross connections. See page 88 for assembly detail.

, ,	
Color	Aluminum
Aluminum	SA502
Satin Anodized	SA502A
Black	SA502B
Dark Bronze	SA502D
Green	SA502G
Almond	SA502L
Brown	SA502N
Sandstone	SA502S
Tan	SA502T
White	SA502W
Light Bronze	SA502Z

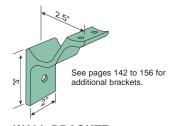


Angle Adjustable Between

ANGLE TEE

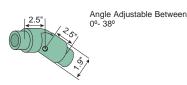
U.S. Patent No. 4,767,232

Color	Aluminum
Aluminum	SA505
Satin Anodized	SA505A
Black	SA505B
Dark Bronze	SA505D
Green	SA505G
Almond	SA505L
Brown	SA505N
Sandstone	SA505S
Tan	SA505T
White	SA505W
Light Bronze	SA505Z



WALL BRACKET

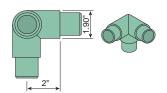
Color	Aluminum
Aluminum	SA515
Satin Anodized	SA515A
Black	SA515B
Dark Bronze	SA515D
Green	SA515G
Almond	SA515L
Brown	SA515N
Sandstone	SA515S
Tan	SA515T
White	SA515W
Light Bronze	SA515Z



ADJUSTABLE ANGLE ELBOW

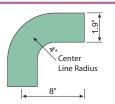
U.S. Patent No. 4,767,232

Color	Aluminum
Aluminum	SA505AM
Satin Anodized	SA505AA
Black	SA505AB
Dark Bronze	SA505AD
Green	SA505AG
Almond	SA505AL
Brown	SA505AN
Sandstone	SA505AS
Tan	SA505AT
White	SA505AW
Light Bronze	SA505AZ



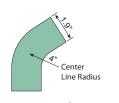
90° 3-WAY ELBOW

00 0 11711 ====011	
Color	Aluminum
Aluminum	SA507
Satin Anodized	SA507A
Black	SA507B
Dark Bronze	SA507D
Green	SA507G
Almond	SA507L
Brown	SA507N
Sandstone	SA507S
Tan	SA507T
White	SA507W
Light Bronze	SA507Z



90° RADIUS ELBOW

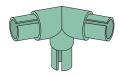
Color	Aluminum
Aluminum	SA510
Satin Anodized	SA510A
Black	SA510B
Dark Bronze	SA510D
Green	SA510G
Almond	SA510L
Brown	SA510N
Sandstone	SA510S
Tan	SA510T
White	SA510W
Light Bronze	SA510Z



Provide Sketch with Required Angle (0°- 41°)

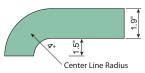
BOTTOM STEP POST ELBOW

Color	Aluminum
Aluminum	SA511
Satin Anodized	SA511A
Black	SA511B
Dark Bronze	SA511D
Green	SA511G
Almond	SA511L
Brown	SA511N
Sandstone	SA511S
Tan	SA511T
White	SA511W
Light Bronze	SA511Z



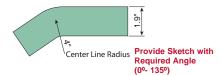
135° 3-WAY ELBOW

Color	Aluminum
Aluminum	SA522
Satin Anodized	SA522A
Black	SA522B
Dark Bronze	SA522D
Green	SA522G
Almond	SA522L
Brown	SA522N
Sandstone	SA522S
Tan	SA522T
White	SA522W
Light Bronze	SA522Z



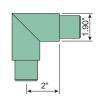
WALL RETURN

Color	Aluminum
Aluminum	SA519
Satin Anodized	SA519A
Black	SA519B
Dark Bronze	SA519D
Green	SA519G
Almond	SA519L
Brown	SA519N
Sandstone	SA519S
Tan	SA519T
White	SA519W
Light Bronze	SA519Z



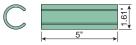
RAIL ELBOW

TO THE PERSON	
Color	Aluminum
Aluminum	SA513
Satin Anodized	SA513A
Black	SA513B
Dark Bronze	SA513D
Green	SA513G
Almond	SA513L
Brown	SA513N
Sandstone	SA513S
Tan	SA513T
White	SA513W
Light Bronze	SA513Z
-	



90º MITER ELBOW

00	
Color	Aluminum
Aluminum	SA506
Satin Anodized	SA506A
Black	SA506B
Dark Bronze	SA506D
Green	SA506G
Almond	SA506L
Brown	SA506N
Sandstone	SA506S
Tan	SA506T
White	SA506W
Light Bronze	SA506Z
Green Almond Brown Sandstone Tan White	SA506G SA506L SA506N SA506S SA506T SA506W



SPLICE CONNECTOR

Aluminum SA517



Series 500 Pipe Railing 1½" IPS Post, Top Rail and Bottom Rail



TOP STEP POST ELBOW

	-
Color	Aluminum
Aluminum	SA512
Satin Anodized	SA512A
Black	SA512B
Dark Bronze	SA512D
Green	SA512G
Almond	SA512L
Brown	SA512N
Sandstone	SA512S
Tan	SA512T
White	SA512W
Light Bronze	SA512Z

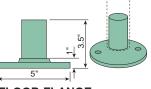




COVER FLANGE

For embeded mount, 30" reinforcing bar (Item #SA597) is required for all commercial applications.

Color	Aluminum
Aluminum	SA509
Satin Anodized	SA509A
Black	SA509B
Dark Bronze	SA509D
Green	SA509G
Almond	SA509L
Brown	SA509N
Sandstone	SA509S
Tan	SA509T
White	SA509W
Light Bronze	SA509Z



FLOOR FLANGE

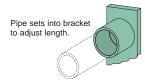
Two 25/64" Diameter Mounting Holes For use in residential applications only.

Color	Aluminum
Aluminum	SA508
Satin Anodized	SA508A
Black	SA508B
Dark Bronze	SA508D
Green	SA508G
Almond	SA508L
Brown	SA508N
Sandstone	SA508S
Tan	SA508T
White	SA508W
Light Bronze	SA508Z



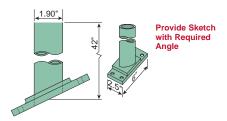
Color	Aluminum
Aluminum	SA514
Satin Anodized	SA514A
Black	SA514B
Dark Bronze	SA514D
Green	SA514G
Almond	SA514L
Brown	SA514N
Sandstone	SA514S
Tan	SA514T
White	SA514W
Light Bronze	SA514Z

POST CAP



SIDE MOUNT FLANGE 30" reinforcing bar (Item #SA597) is required for all commercial applications.

Color	Aluminum
Aluminum	SA540
Satin Anodized	SA540A
Black	SA540B
Dark Bronze	SA540D
Green	SA540G
Almond	SA540L
Brown	SA540N
Sandstone	SA540S
Tan	SA540T
White	SA540W
Light Bronze	SA540Z



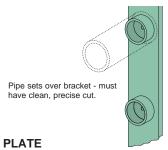
ANGLE FLANGE WITH POST

Color	Aluminum
Aluminum	SA518
Satin Anodized	SA518A
Black	SA518B
Dark Bronze	SA518D
Green	SA518G
Almond	SA518L
Brown	SA518N
Sandstone	SA518S
Tan	SA518T
White	SA518W
Light Bronze	SA518Z

ADJUSTABLE BRACKET

Wall Plate sold separately - order SA520.

Trail I late sold separately	oraci Onozo.
Color	Aluminum
Aluminum	SA521
Satin Anodized	SA521A
Black	SA521B
Dark Bronze	SA521D
Green	SA521G
Almond	SA521L
Brown	SA521N
Sandstone	SA521S
Tan	SA521T
White	SA521W
Light Bronze	SA521Z

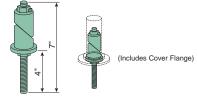


HEAVY DUTY BASE

30" reinforcing bar (Item #SA597) is required

(Flat or 43/40 Ramp)

for all commercial application	S.
Color	Aluminum
Aluminum	SA541
Satin Anodized	SA541A
Black	SA541B
Dark Bronze	SA541D
Green	SA541G
Almond	SA541L
Brown	SA541N
Sandstone	SA541S
Tan	SA541T
White	SA541W
Light Bronze	SA541Z



WEDGE BASE WITH STUD

Color	Aluminum	
Aluminum	SA550	

WALL PLATE

Adjustable Bracket sold separately - order part **SA521**.

•	
Color	Aluminum
Aluminum	SA520
Satin Anodized	SA520A
Black	SA520B
Dark Bronze	SA520D
Green	SA520G
Almond	SA520L
Brown	SA520N
Sandstone	SA520S
Tan	SA520T
White	SA520W
Light Bronze	SA520Z

3/4" PICKETS

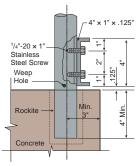
16' Lengths

Thick.	Aluminum
.050"	SA5B
.050"	SA5BA
.050"	SA5BB
.050"	SA5BD
.050"	SA5BG
.050"	SA5BL
.050"	SA5BN
.050"	SA5BS
.050"	SA5BT
.050"	SA5BW
.050"	SA5BZ
	.050" .050" .050" .050" .050" .050" .050" .050" .050"



3M™ SCOTCH-WELD™ EPOXY

Applicator Gun with Plunger, **SA533** 1 50 ml Epoxy and 2 Tips 1 50ml Epoxy Cartridge Refill and 2 Tips **SA531** Plunger SA534



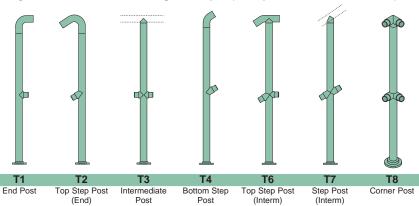
TOE BOARD

24' Lengths
4" × 1" × 16" Aluminum Channel

4 × 1 × /8 Aluminum Channel		
Color	Aluminum	
Aluminum	SA596	
Satin Anodized	SA596A	
Black	SA596B	
Dark Bronze	SA596D	
Green	SA596G	
Almond	SA596L	
Brown	SA596N	
Sandstone	SA596S	
Tan	SA596T	
White	SA596W	
Light Bronze	SA596Z	
-		

PRE-ASSEMBLED POST DESIGN SELECTIONS Aluminum

Pre-assembled posts have 30" hollow aluminum reinforcing bar for strength. Mounting and spacing to be determined. Contact Wagner with your post style, dimensions and mount option.



Post

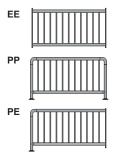
(Interm)

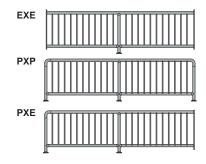
(Interm)

A 90° Tee B 90° Corner Tee C 90° Three-Way Elbow D Floor Flange E Wall Plate	

PICKET RAILING DESIGN SELECTIONS

3/4" round; 41/2" on center







For interior applications use *Rockite*[®]. For exterior applications use Kwixset®. Refer to page 202 for more information on Rockite® and Kwixset® Cement.

ROCKITE®

Anchor Cement

A TOTOL OCITION	
50 lb. pail	RK10051
10 lb. box	RK10010
Follow package instructions.	

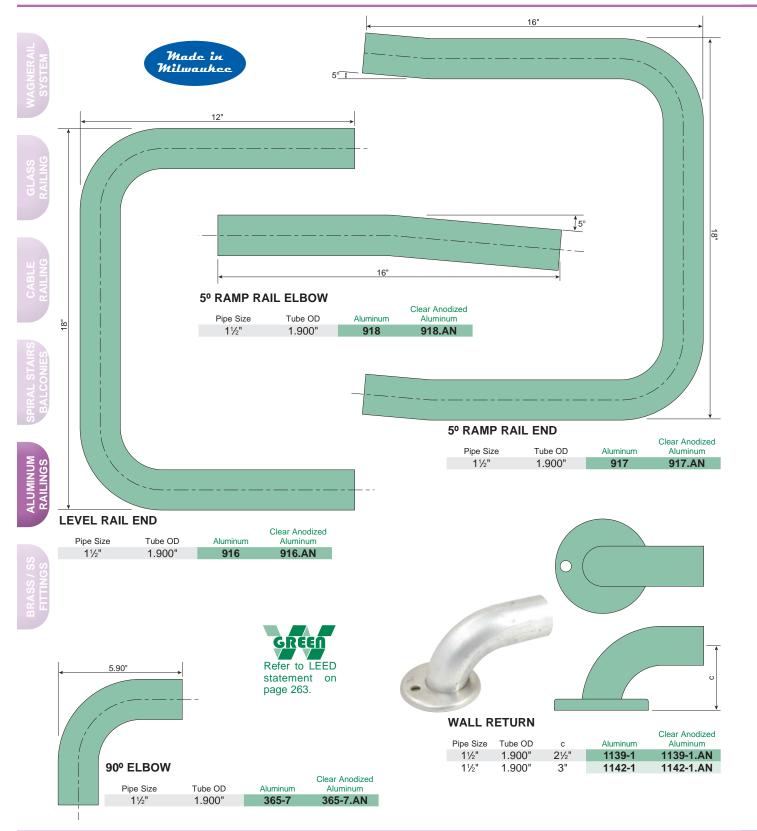


KWIXSET®

Exterior Anchor Cement

50 lb. pail	KW10402
10 lb. box	KW10401
Follow package instructions.	

Aluminum Rail Ends www.shopwagner.com



SINGLE-LOCK SPLICE-LOCK™

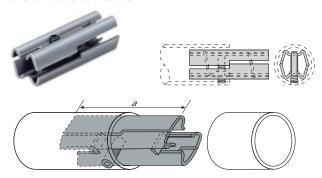
PATENTI

Splice-locks™ are designed for the alignment of handrail sections and as expansion joints. They are most effective as a joint stiffener when used within 12" of a welded post or handrail bracket.

The screw hole is threaded into the connector and the *Splice-Lock's* prongs hold the piece together as a unit allowing for simple insertion into the pipe or tube. The set screw is a headless socket with a cup end.

 $Splice-locks^{\intercal M}$ have a similar shear strength as standard pipe but are not to be used in post assemblies.

Single-Lock Splice-Locks™ are for use as connectors or expansion joints. For maximum strength, use **Double-Lock Splice-Locks™**. Go to page 169 to view **Double-Lock Splice Locks™** and other available connectors.



SINGLE SPLICE-LOCK™ FOR PIPE AND ROUND TUBING

Use as Connectors or Expansion Joints

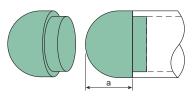
Pipe	Sch.	Tube	Wall	2	Aluminum	Stainless	Set Screw
i ipc	OCI I.	Diameter	THICKINGS	а	Alaminam	Otalilioss	OCT OCICW
11/2"	40	1.900"	.145"	3¾"	3319	3321	3/8" × 13/8"
11/2"	40	1.900"	.145"	6"	3345	3349	3/8" × 13/8"



Francisco • Polishing



All metals have a recycled content and high reclamation rate. Contact **Wagner** for data relating to your specific product selections.



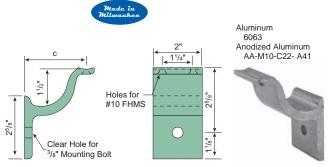


TYPE A MACHINED DRIVE-ON END CAPS FOR PIPE

Deburr inside of pipe to give chamfered caps an easy start. Refer to pages 206 to 209 for other end caps.

11/2"	1.900"	11/8"	3232AM•	3232AM.AN
Pipe Size	Tube OD	а	Aluminum	Clear Anodized Aluminum

• Denotes part shown in photograph



EXTRUDED HANDRAIL BRACKET SQUARE BASE

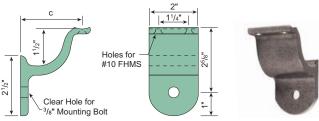
С	6063 Aluminum	Aluminum
21/2"	ER8103	ER8103A
31/4"	ER8003	ER8003A

LONG LENGTH SHAPE

This extruded handrail shape is available in 5' lengths with no holes.

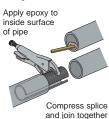
С	6063 Aluminum	lb/ft	lb/ft	length
21/2"	BER8103	BER8103A	2.50	5'
31/4"	BER8003	BER8003A	2.50	5'

The *Extruded Handrail Bracket* meets codes requiring a 1½" minimum clearance between the handrail and the wall and the underside of the handrail and horizontal bracket arm.



EXTRUDED HANDRAIL BRACKET ROUND BASE

С	6063 Aluminum	Anodized Aluminum
21/2"	ER8104	ER8104A
3"	FR8004	FR8004A



Durable, maintenance-free pipe railing that is quick and easy to install without welding.

Railing Splices are designed for a tight press fit and must be compressed with a pliers to permit them to slip into the pipe. The areas to be joined should be cleaned thoroughly. Mix 3M™ Scotch-Weld™ Epoxy according to manufacturer's directions. Mix only enough that you can use within ½ hour. Apply Epoxy to inside surface of pipe. Compress Splice Sleeve with pliers then slip into the pipe. Wipe off excess **Epoxy** after components are properly joined. The areas connected

together should be left undisturbed for eight hours - longer in cold weather. See page 85 for 3M[™] Scotch-Weld[™] Epoxy.

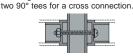
Tee Fittings





Attachment of tee fitting to a vertical post.

A through bolt is used in combination with



To attach the tee fitting to the post, a self-tapping, stainless steel, hexagon head screw with lockwasher is positioned through the fitting and threaded into the post. Use of a thread adhesive i.e., Lido-Weld on page 97 - is strongly recommended.

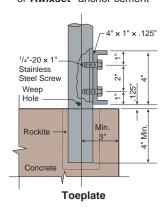
When two 90° tees are located directly opposite each other to form a cross, a stainless steel through bolt, lockwasher and locknut are used - SA524 and SA525.

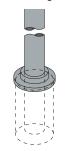
Mounting Options

Pipe or picket railing can be embedded in concrete and grouted, or mounted on decks and platforms with base flanges, or side-mounted on fascia or stringer by means of fascia flanges.

Embedded Post

- Cover flange
- 30" reinforcing bar (6063-T5) required in all commercial applications
- 1/4" weep hole at 1/2" above flange
- Minimum depth: 4" (5" to 6" preferred)
- 3½" minimum from center of post to edge of slab
- 11/2" minimum from edge of hole to edge of slab
- 1" minimum grout pad
- Set into place with Rockite® or Kwixset® anchor cement







Side Mount Flange





Floor Flange

Floor Flange

Series 500 railing meets federal safety requirements as determined by an independent testing laboratory. Test results are available upon request.



Consider the Advantages . . .

- . No rusting No painting
- Unlimited designs
- · Easy installation without welding
- Durable and functional design
- · Strong and decorative
- Saves on installation and maintenance labor

... and the Possibilities

- ADA Ramps
- Condominiums
- Industrial Buildings
- Stores
- Waste Water Treatment Plants
- Nursing Homes
- Municipal Buildings
- Schools
- Office Buildings

- Motels
- Churches Hospitals
- Factories
- Amusement Parks
- Restaurants
- Swimming Pools
- Cafeterias
- Residential

Expansion Joints

For continuous spans in excess of 40 feet, expansion joints should be provided. To make an expansion joint, one end of a spliced joint should not have structural adhesive applied so that it is free to move in or out of the pipe. If a joint is provided every 30 feet, the width of the gap should allow 1/8" expansion for each 40°F of expected temperature rise. All pipe railing splices should be made no more than 12" from the nearest post.

Materials

All rails and posts are produced from extruded, 6063-T6 aluminum pipe, 11/2" Schedule 40 - 1.900" outside diameter with a .145" wall thickness. Where there are formed elbows, 6063-T4 alloy is used. All railing accessories are cast from ANSI 713 alloy. Fasteners used in the system should be aluminum or stainless steel.

Workmanship

All pipe cuts should be square and accurate for minimum joint-gap. Cuts should be clean and free of chamfer from deburring nicks and burrs. Holes should be drilled the proper size for a tight flush fit of rivets and screws. All posts grouted in concrete must have one 1/4" diameter weep hole, ½" above post collar, in the plane of the rail.

Post spacing is not to exceed 6'-0", center-to-center. All posts will be single, unspliced pipe length. Lower rails should be single, unspliced lengths between posts. All top rails shall be continuous whenever possible. All fasteners should be tightened so that the completed railing is rigid and free of play at joints and component attachments.

Series 900, 950 and 990 Heavy-Duty Aluminum Railings offer the finest railing design features available on the market today. Highest quality aluminum alloy extrusions are used to provide maximum strength and support where it is needed most — in your installation.

All **Series 900 Railings** utilize the advantages of aluminum – strength, durability and low maintenance. These characteristics make aluminum railings a practical, sound investment for the budget-minded builder. No complicated fittings. No costly custom-made fabrication. A minimum of fasteners make **Series 900 Railings** easy to install.

Series 900 Railings are available in heights from 32" to 48". Optional pool railing is available in heights up to 72". Factory assembled railings are made to your exact specifications resulting in further site fabrication savings.

Series 900 Railings can be found wherever clean design and safety are a must. It is well-suited for condominiums, apartments, motels, churches, schools, commercial buildings and homes.

To make **Series 900** even more versatile, decorative flat columns, inserts and scrolls are available.





SERIES 900
Posts: 2½" square
Pickets: ¾" square
Top Rail Options
Width Height A

Top Rai	I Options	
Width	Height	Aluminum
21/2"	15/8"	SA901
2"	4"	SA902

 SERIES 950

 Posts:
 2" square

 Pickets:
 3/4" square

 Top Rail Options
 Aluminum

 Width
 Height
 Aluminum

 2½"
 15/6"
 SA901

SERIES 990 Posts: 21/2" square **Pickets:** $1\frac{1}{2}$ " × $\frac{3}{4}$ " rect. Top Rail Options Width Height Aluminum 21/2" 15/8" SA901 2" **SA902** 4" 2" **SA905** 1%"



Style A Standard Top Rail System

10p Kai	Options	
Width	Height	Aluminum
21/2"	15/8"	SA901
2"	4"	SA902
2"	15/8"	SA905

Style B Double Top Rail System

Top Rai	l Options	
Width	Height	Aluminum
21/2"	15/8"	SA901
2"	4"	SA902
2"	15/8"	SA905

Style C 4" Square Post System

Top Rail	Options	
Width	Height	Aluminum
21/2"	15/8"	SA901
2"	4"	SA902

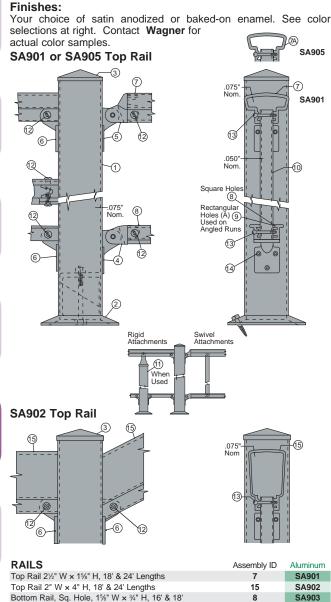






and durability will compliment your construction ideas.

The well-crafted clean lines of **Series 900 Railing** fits almost any commercial or residential building application. It's beauty, strength



POSTS & PICKETS (continued) Assembly	/ ID	Aluminum
Picket 3/4" × 11/2"		SA9D
Wall Plate		SA90
End Post		SA91
Swivel Post		SA92
Crossover Post	11	SA93
Bottom Step Post		SA94
Section Post		SA95
Top Step Straight Post		SA96
Intermediate Step Post		SA97
Corner Post		SA98
Top Step Corner Post		SA99
CAST FITTINGS		Aluminum
Base for 2.00" or 2.50" Post		SA722
17" Heart Scroll		SA906
2½" Wedge Base with Stud		SA916
Angle Base for 2.00" Post		SA918
2" Slip Over Base		SA919
2½" Slip Over Base		SA920
¾" Square Base		SA921
3/4" x 11/2" Base		SA922
Adj. End Bracket for SA905		SA939T
End Bracket for Top & Bottom Rail	6	SA940
End Bracket for SA903 Bottom Rail		SA940B
17" Cast Fleur De-Lis Insert		SA941
Cap for 2.00" Post		SA942
Adj. End Bracket Top for SA902		SA946
Adj. End Bracket Top for SA901		SA947T
Adj. End Bracket for SA903 Bottom Rail		SA948B
End Bracket for SA902		SA949
Cap for 2.50" Post		SA950
Post Ball Cap for 2½" Post		SA951
Top Rail Hinge 2½" Width		SA952
2-Way Swivel Bracket Bottom		SA953B
2-Way Swivel Bracket Top		SA953T
Horiz. Swivel Bracket Bottom		SA954B
Horiz. Swivel Bracket Top, 21/2"		SA954T
Vertical Swivel Bracket for SA901 Top Rail 21/2" Width	5	SA955
Vertical Swivel Bracket for SA904 Bottom Rail		SA956
Base for 2.50" Post, Wedge Type	4	SA957
Angle Ramp Plate	2	SA958
Vertical Swivel Top for SA905 Top Rail 2" Width		SA959
Crossover Cap for 2.00" Post		SA960
Cap for 2.00" Post		SA961
Top Rail Hinge 2" Width for SA906		SA962
Top Rail Corner 2" Width for SA901 Top Rail		SA963
Top Rail Corner 2½" Width		SA964
Crossover Cap for 2.50" Post		SA965
Crossover Cap for 2.50" Post, Flat		SA966
Crossover Cap for 1.50" Square Tube		SA967
Base for 2" Post, Wedge Type		SA968
Horiz. Swivel Bracket Top, 2" Width for SA905 Top	Rail	SA969T
Angle Crossover Cap for 21/2" Step Post		SA970
Cap for 2.50" Post, Heavy Wall		SA971
Crossover Cap for 2.50" Post, Heavy Wall		SA972
Heavy-Duty Base for 2.50" Post		SA973
2½" Sq. 42", ¾6" with SA973 Welded On		SA974
Side Mount Bracket for 2½" Post		SA975
Corner Side Mount Bracket for 2½" Post		SA976
Wall Return, Left-Hand, for SA905 Top Rail		SA978L
Wall Return, Right-Hand, for SA905 Top Rail		SA978R
End Cap for SA905 Top Rail		SA979
End Cap for SA901 Top Rail		SA980
End Cap for Bottom Rail for SA903		SA981
End Cap for SA902 Top Rail		SA982
Lamb's Tongue for SA901 Top Rail		SA983
Horizontal Swivel for SA902		SA984T
Wall Bracket for Handrail 3"		SA985
Lamb's Tongue for SA905 Top Rail		SA986
Post Ball Cap for 2.00" Post		SA989
Post Finial for 2.50" Post		SA999
		SA992 SA993
Cast Rose Shan-on Picket Insert		OH333
Cast Rose, Snap-on Picket Insert Cast Grape, Snap-on Picket Insert		SA994



















Light Bronze (Z)

SA904

SA905

SA909

Aluminum SA910

SA912

SA910

SA915

Aluminum

SA990

SA377

SA380

Aluminum

SA9B

SA9C

7A

13

12

14

Bottom Rail, Rect. Hole, 15/8" W x 3/4" H, 16' & 18'

POSTS & PICKETS Height: 32", 36", 42" or 48"

Top Rail 2" W x 1%" H, 18' & 24' Lengths

FASTENERS

Rail Bracket Binder Bolt

Post Bracket Rivet 5/32

2" Square, 16' Lengths

4" Square, 16' Lengths

Rail Bracket Binder Bolt 8/32"

21/2" Square, 16' & 18' Lengths

Picket 3/4" Square, 41/2" Centers

Picket 3/4" Square, 6" Centers

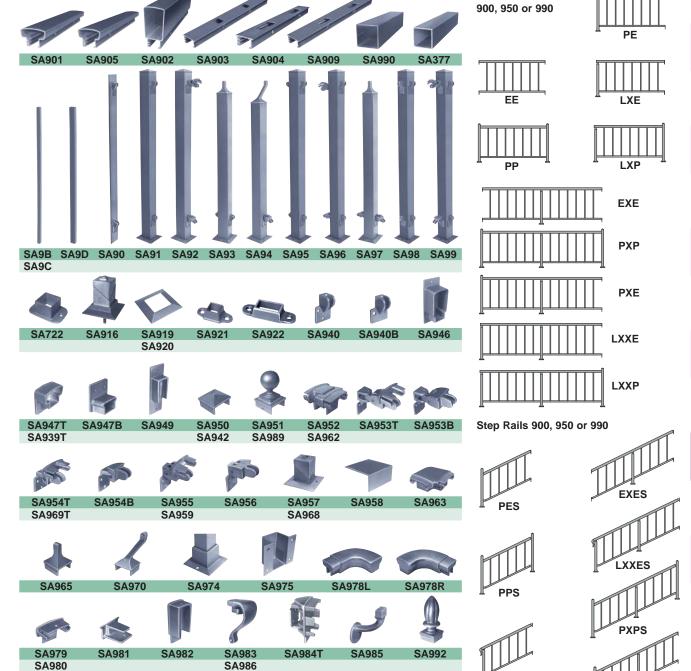
Picket Screws

TUBING

Bottom Rail, 11/2" W Hole, 16' & 18' Lengths

Straight Rails

SA906



SA993

PXES

LXXPS

LXPS

SA995