TSM TUBULAR SPECIALTIES MANUFACTURING, INC.

Architectural Ornamental Handrails and Railings
Architectural Metalwork

Standard Components and Custom Design

STAINLESS STEEL, ALUMINUM, BRASS

Union Station
Los Angeles, California
Architect: Harry Weese Associates
Satin Finish Type 304 Stainless Steel
Top Rail & Posts 1 1/2" x 1 1/2" Square Solid Bar (38x38mm)
Intermediate Lines 3/4" x 3/4" Square Solid Bar (19x19mm)
Ribbon 1 1/4" x 1/4" Bar Stock (32x4mm) • Model #GRD-148

Challenge:

What to do when the actual field dimensions do not match the drawings?

TSM *Solution:*

The undulating ribbons of 1 1/4" x 1/4" bar stock (32x6.4mm) are an engineering marvel. Although they appear to be equal sizes, the stair increments were actually all slightly different measurements, requiring the ribbons to be minutely expanded or contracted as needed to fit precisely. As always, TSM stays as close as possible to all original designs. It is our goal to make your designs a reality.

Series GRD . . . . . Pages 2-5
Custom Railing and Architectural Metalwork

Series 300 . . . . . Pages 8-9
Stainless Steel Component Wall Rail System

Series 400 . . . . . Pages 16-19
Brass Component Rail System

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Stainless Steel Component Floor Mounted Rail System

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Stainless Steel Picket Rail System

Series 600 . . . . . Pages 14-15
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Custom Wall Rail System

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Custom Floor Mounted Rail System

TUBULAR SPECIALTIES MANUFACTURING

(**TSM**) *prides itself on fabricating rails and architectural metalwork with expertise and craftsmanship, projects that range from simple handrails to elaborate, monumental railing systems.*

- Off-the-shelf component railing systems as well as custom fabricated projects are designed for ease of installation and worldwide shipping
- Up to 10' long (3048mm) floor mounted railings and up to 18' long (5486mm) wall railings are shipped in one piece; longer lengths are shipped in sections, to be joined at jobsite
- Assembly of sections at jobsite is with internal dowels and adhesive, splice lock with set screw, or welding
- Technical assistance to designers, fabricators and contractors - our extensive experience helps avoid costly mistakes
- Warehouses in California, New Jersey and Washington
- International rep network

Projects

Our three decades of experience in manufacturing railings have resulted in installations throughout the world. Here are just a few.

Laquis Building	Trinidad, West Indies
United Christian Hospital	Hong Kong
Hard Rock Café	Guam and Saipan
North Manchester District Hospital	England
North Devon District Hospital	England
Hospital ABC	Mexico City
Hospital Medica Sur	Mexico City
Empire State Building	New York City
Sunset Gower Studios	Hollywood, California
Broadmoor Resort	Colorado Springs, Colorado
Veterans Administration Hospitals	Miami, Florida; Albany, New York; many others
Alexander Sports Stadium	England
Opera House	Yucatan
Pennsylvania Hospital	Philadelphia, Pennsylvania
McGraw Hill Cardiovascular Center	New York City
National Museum of African Art	Washington, D.C.
Country Club Metropolitano	Bogota, Columbia
Central Bank	Barbados
University of California	Santa Barbara, California

Challenge:

How to provide a large quantity of complex railings to an installation thousands of miles away from our plant?

TSM Solution:

TSM specializes in shipping custom fabricated railings worldwide. Custom railing is completely fabricated in our shop and shipped in sections. The longest individual section shipped for Jackson Airport was 16' (4877mm) long. The installer was able to fit the sections together with minimum fuss using TSM's simple internal dowel and adhesive connection method. The result is a rail that is so seamless that it looks as if it was fabricated inside the airport itself instead of Los Angeles.

Jackson Airport

Jackson, Mississippi • Architect: Ed Lewis and Associates
Bright Finish Type 304 Stainless Steel • 1 1/2" O.D. Seven Line Floor Mounted Rail (38mm) • Model #U-150-7/B

Challenge:

How to meet code requirements with elegance and style, keeping within a moderate budget?

TSM Solution:

TSM proposed several designs to meet the requirement that a 4" or larger sphere (102mm) should not pass through the openings of a guard rail. The customer selected this stainless steel mesh infill panel for its moderate price, easy maintenance and modern, upscale appearance. TSM can help you design rails that fit your budget and your priorities for each project.

Dupont/Merck Pharmaceutical Laboratory

Wilmington, Delaware • Architect: Kreider/Mastinger • Satin Finish Type 304 Stainless Steel
Guard Rail: Posts 1.9" O.D. (48mm) • Infill Panel 1/4" O.D. (6.4mm) Rod with 4" x 4" Openings (102x102mm) • Model #GRD-121

Pershing Square Subway Station

Los Angeles, California • Architect: Arthur Erickson • Satin Finish Type 304 Stainless Steel
Top Rail & Posts: 1 1/2" x 1 1/2" Square Solid Bar (38x38mm) • Intermediate Lines: 3/4" x 3/4" Square Solid Bar (19x19mm)
Infill Panels 1/8" Thick (3.2mm) Sheet with 4" O.D. Perforation (102mm) • Model # GRD-133

Challenge:

How to fabricate one-of-a-kind spiral staircase rails, which are tricky to form flawlessly?

TSM Solution:

Most spiral staircase manufacturers are limited in scope to only making rails that will fit a prepackaged stair measurement or forming the spiral rails at the jobsite. TSM does not make stairs, only the rails themselves, but we can make them to fit any unusual application. These beautiful ellipses were made in our factory strictly from plans supplied by the contractor, and they fit perfectly when they arrived.

Westin Maui

Maui, Hawaii
Architect: Lawton Umemura Architects
Bright Finish Brass 2" O.D. One-Line
Floor Mounted Rail (51mm)
Model # U-200-1/BB

Civic Center Station

Los Angeles, California
Architect: Arthur Erickson
Satin Finish Type 304 Stainless Steel
Barrier Railing 12" O.D. x .25" (305x6.4mm), Posts 2" x 6" x .120" (51x152x3mm)
Model #GRD-842

Challenge:

How to produce a consistent finish on 12" diameter stainless steel tubing?

TSM Solution:

It's a well-known fact that the larger diameter of the tubing, the more difficult it is to produce a consistent finish. Furthermore, the bending and handling of this extraordinarily heavy tube had produced many noticeable indentations in the tubing surface. TSM solved this by filling the dents with welding. The weld buildup was then ground smooth and polished, using state-of-the-art equipment and tooling designed and manufactured by the TSM staff. Upon completion, the entire rail had a beautiful finish that was so consistent that even the workers who had done it could not detect where the original surface defects had been.

Challenge:

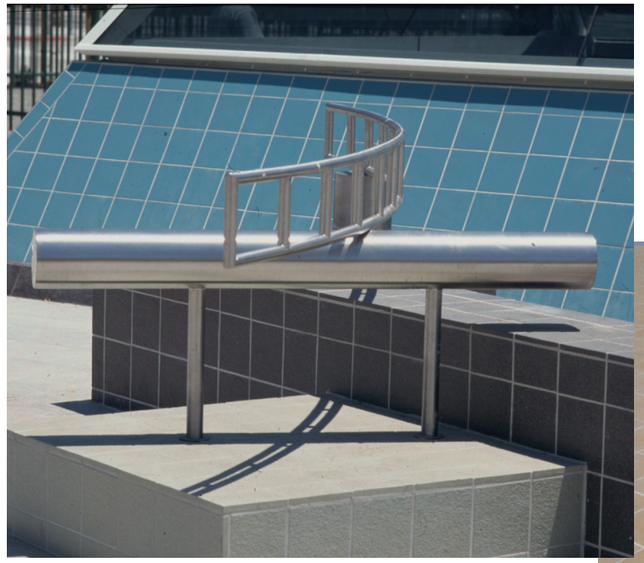
How to attach the heavy, 7' long (2134mm) gates to the posts?

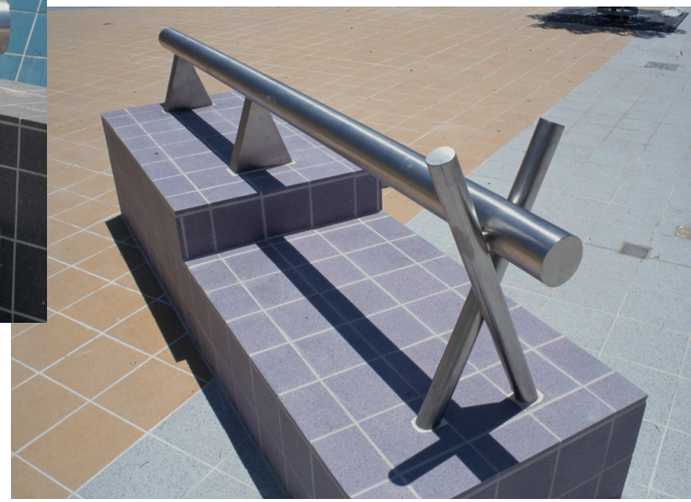
TSM Solution:

The length of these custom gates required heavy-duty hinges that were not commercially available and had to be designed and fabricated by TSM. TSM has since then provided these hinges for several other projects.

Civic Center Subway Station

Los Angeles, California
Architect:
Arthur Erickson
Satin Finish Type 304
Stainless Steel
Railing Top Line and
Half-Circle End,
1.9" O.D (48mm)
Posts 1½" x 1"
(38x25mm);
Centerline Rail
3" O.D. (76mm) with
Light Housing Welded
to Posts and Welded
Dome Cap
Model # GRD-896





Fundadores Station

Monterrey, Mexico
Architect: Albuerne & Associates
Satin Finish Type 304 Stainless Steel
Parapet Rail: 1.9" O.D. (48mm) with Welded Dome Cap
Side Mounted Handrail 1.9" (48mm) with Welded Dome Cap
Brackets & Posts 2" x ¼" Flat Bar (51x6.4mm)
Gate: Frame 2" O.D. x .120" (51x3mm)
End Post 4" O.D. x .120" (102x3mm) with Welded Dome Cap
Crosspieces 5/8" O.D. (16mm); Barrel Hinges
Parapet Rail Model # GRD-156
Gate Model # GRD-604

Wilshire & Vermont Subway Station

Los Angeles, California
Architect: Aziz Kohan
Satin Finish Type 304 Stainless Steel
Bench at Left : Tubing 8" O.D. x .120" (203x3mm), Posts 2½" x .120" (64x3mm) Curved Ladder 1" O.D. x .120" (25x3mm)
Bench at Right: Tubing 6" O.D. x .120" (152x3mm) and 3" O.D. x .120" (76x3mm) Triangle Posts 1/8" Plate (3mm)
Left, Model #GRD-822
Right, Model #GRD-827

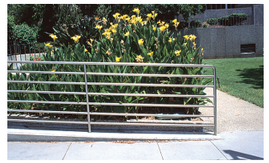
Stainless Steel, Brass and Aluminum Floor Mounted Rail (Series U-Line)

Floor mounted railings may be used in stairwells, on wheelchair ramps, as safety railing, crowd control railing and as design accent pieces. Fax your drawing to TSM for a free estimate.

MODEL NUMBERS FOR TWO-LINE FLOOR MOUNTED RAILING

	Satin Finish Stainless Steel	Bright Finish Stainless Steel	Satin Finish Brass	Bright Finish Brass	Clear Anodized Aluminum
1¹/₂" O.D. Tubing (38mm)	U-150-2	U-150-2/B	U-150-2/SB	U-150-2/BB	-
1.9" O.D. Tubing (48mm)	U-200-2	U-200-2/B	-	-	-
2" O.D. Tubing (51mm)	-	-	U-200-2/SB	U-200-2/BB	-
1¹/₄" Schedule 40 Pipe	-	-	-	-	U-150-2/AH
1¹/₂" Schedule 40 Pipe	-	-	-	-	U-200-2/AT

For other than two-line, substitute horizontal lines desired (from one to eight) in lieu of -2 in model numbers above. For example, one-line railing in 1.9" Satin Finish Stainless Steel Tubing would be model #U-200-1.

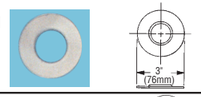
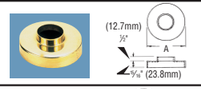
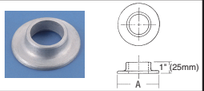


7-Line Rail Model #U-150-7

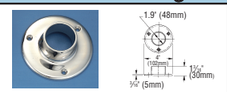
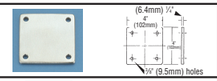
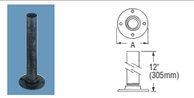
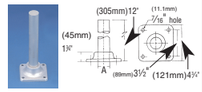
1-Line Rail Model #U-150-1

Decorative Flanges for Embedded Posts

The recommended method of installing floor-mounted railing is to embed the posts 4"-6" into concrete (102-152mm). The posts may be left as is, or a decorative flange may be added for finishing purposes only to conceal the grout surrounding posts. The decorative flanges include:

Decorative Flange	Installation	How to Specify
R-1D Stainless Steel 	R-1D is a disk with no screw holes. To install, place R-1D on the cement while it is wet. For a dry installation, apply epoxy, silicon adhesive or caulking material to the underside of the R-1D. For more installation information, see Sweet's CD.	Add suffix /R-1D to the model number above. For example, U-150-2 has posts embedded without flanges; U-150-2/R-1D has decorative flanges.
429C Brass 	The 429C is a collared cover plate with no screw holes. Apply epoxy (or see suggestions above) to tubing so the collar will adhere to it. A=4" (102mm) for U-150 & 4 15/16" (125mm) for U-200	Add suffix /429C to the model number above. For example, U-200-2/BB has posts embedded without flanges; U-200-2/BB/429C has decorative flanges.
660 Aluminum 	660 is a collared floor flange. Installs the same as R-1D and/or 429C. A=3 13/16" (97mm) for U-150 & 4" (102mm) for U-200	Add /660 to the model number above. For example, U-150-2/AH has posts embedded without flanges; U-150-2/AH/660 has decorative flanges.

Surface Mounted Flanges for Wooden Decks

Surface Mounted Floor Flange	Installation	How to Specify
SF-4W Stainless Steel, Round 	SF-4W is a heavy-duty exposed screw flange welded to the tubing underneath the collar. While lag bolts are generally used with a wood deck, it is the installer's responsibility to select appropriate fasteners for a particular application.	Add /SF-4W to the model number above. For example, U-200-2 has posts embedded without flanges; U-200-2/SF-4W has surface mounted floor flanges.
SF-6 Stainless Steel, Square 	SF-6 is a heavy-duty exposed screw flange surface welded to the tubing. See SF-4W.	Add /SF-6 to the model number above. For example, U-200-2 has posts embedded without flanges U-200-2/SF-6 has surface mounted floor flanges.
429C Brass Cover Plate with 429IF Iron Flange 	See 429C above. 429IF is a heavy-duty flange with a reinforcing post insert that provides extra stability inside brass tubing. The 429C slips over the iron flange. Apply epoxy, silicon adhesive or caulking material to tubing so the collar on the 429C will adhere to it. A=3¾" (95mm) for U-150 & 4½ (114mm) for U-200	Add /429CIF to the model number above. For example, U-150-2/BB has posts embedded without flanges; U-150-2/BB/429CIF has surface mounted floor flanges.
662 Aluminum Heavy Duty Floor Flange 	662 is a heavy-duty exposed screw flange with a reinforcing post insert that provides extra stability inside aluminum pipe. See SF-4W. A=1.4" (35mm) for U-150 & 1.6" (40mm) for U-200	Add /662 to the model number above. For example, U-150-2/AH has posts embedded without flanges; U-150-2/AH/662 has surface mounted floor flanges.

TUBING OR PIPE, CUSTOM CUT TO FIT WALL, POSTS EVENLY SPACED AT MAXIMUM 5' INTERVALS (1524mm):

- Stainless steel tubing is type 304 (18-8), satin or bright finish in 1¹/₂" O.D. with 2" radius (38 & 51mm) and 1.9" O.D. with 4" radius (48 &102mm).
- Brass tubing is alloy CDA 260, satin or bright finish in 1¹/₂" and 2" O.D. (38&51mm).
- Aluminum pipe is alloy 6063 with clear anodized finish in 1¹/₄" and 1¹/₂" Schedule 40.

CONNECTIONS:

- Up to 10' long (3048mm) floor mounted railings are shipped in one piece; longer lengths are shipped in sections, to be joined at jobsite. Assembly of sections at jobsite is with internal dowels and adhesive, splice locks with set screw, or welding.

Stainless Steel and Brass Wall Railing (Series RU)

Custom stainless steel and brass wall railings save money on installation costs because they're delivered complete and ready to hang. There's no time-consuming cutting or fitting on the job and no lost components. TSM can provide a free estimate if you will provide us with the total footage and the number of individual lengths. For projects with corners, slopes, custom bends, etc., we request a drawing.

CS-1 & R-1 FLANGES

Description		Satin Finish Stainless Steel Model #	Bright Finish Stainless Steel Model #	Satin Finash Brass Model #	Bright Finish Brass Model #
Flanged Returns w/Fixed Center Supports	1¹/₂"/CS-1 1¹/₂"/R-1	RU-150/T-90/CS-1 RU-150/T-90/R-1	RU-150/T-90/CS-1/B RU-150/T-90/R-1/B	RU-150/T-90/CS-1/SB	RU-150/T-90/CS-1/BB
Flanged Returns w/Movable Center Supports	1¹/₂"/CS-1 1¹/₂"/R-1	RU-150/T-90/CS-1/C-70 RU-150/T-90/R-1/C-70	RU-150/T-90/CS-1/C-70/B RU-150/T-90/R-1/C-70/B	RU-150/T-90/CS-1/C-70/SB	RU-150/T-90/CS-1/C-70/BB
Decorative Black Plastic Plugged Ends w/Fixed Center Supports	1¹/₂"/CS-1 1¹/₂"/R-1	RU-150/T-95/CS-1 RU-150/T-95/R-1	RU-150/T-95/CS-1B RU-150/T-95/R-1/B	RU-150/T-95/CS-1/SB	RU-150/T-95/CS-1/BB
Decorative Welded End Caps w/Caps Fixed Center Supports	1¹/₂"/CS-1 1¹/₂"/R-1	RU-150/T-95SS/CS-1 RU-150/T-95SS/R-1	RU-150/T-95SS/CS-1/B RU-150/T-95SS/R-1/B	RU-150/T-95BB/CS-1/SB	RU-150/T-95BB/CS-1/BB
Open Ends w/Fixed Center Supports	1.9"/CS-1 2"/CS-1	RU-200/T-950/CS-1	RU-200/T-950/CS-1/B	RU-200/T-950/CS-1/SB	RU-200/T-950/CS-1/BB

SF-6 FLANGE

Description		Satin Finish Stainless Steel Model #	Bright Finish Stainless Steel Model #
Open Ends Fixed Center Supports	1.9"	RU-200/T-950/SF-6	RU-200/T-950/SF-6/B

TUBING, CUSTOM CUT TO FIT WALL.

- Stainless steel is type 304 (18-8), satin or bright finish available in 1¹/₂" and 1.9" O.D. (38&48mm).
- Brass is alloy CDA 250, satin or bright finish available in 1¹/₂" and 2" O.D. (38&51mm).

ENDS, FLANGED:

- T-90 - Ends are turned 90° by mandrel bending and heliarc welded to flanges to form a single structural unit.

ENDS, DECORATIVE; RETURNED WITHIN ¹/₄" (6.4mm) OF WALL FACE:

- T-95 - Heavy duty black Butyrate. Press fit into ends.
- T-95SS - Stainless steel cap welded to ends.
- T-95BB - Brass cap welded to ends.
- T-950 - Ends of tubing are left open.

FLANGES WITH 1¹/₂" WALL CLEARANCE:

- CS-1: 3" round (76mm), 14 gauge base (2.1mm) with three ¹/₄" (6mm) mounting holes and 20 gauge cover (.9mm), snap-lock concealed screw design.
- SF-6: 4" square (102mm), ¹/₄" thick (6.4mm) with four exposed screw 3/8" diameter mounting holes (9.5mm).
- R-1: 3" round (76mm), 14 gauge (2.1mm) with three ¹/₄" (6mm) mounting holes. *Shown with Model #305U on page 9*

FLANGE WITHOUT 1¹/₂" WALL CLEARANCE:

- SF-4: 4" round (102mm), 3/16" thick (5mm) with three ¹/₄" (6mm) mounting holes. *Shown on page 6.*

CENTERS SUPPORTS:

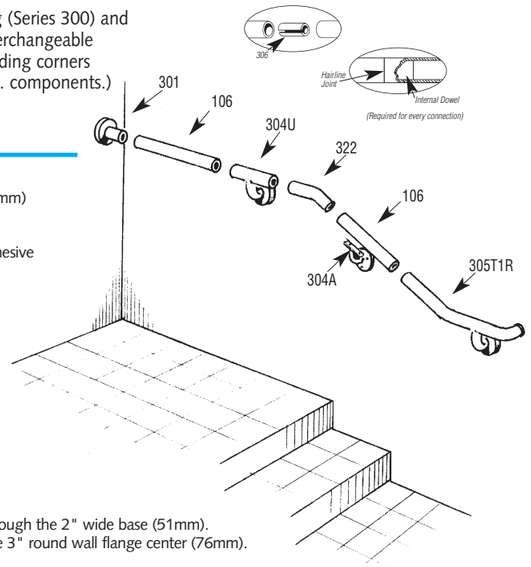
- Fixed (standard) or movable (C-70).

RU-150/T-90/CS-1/C-70/B
RU-150/T-95/CS-1/SB
RU-200/T-95/CS-1/BB

Starbucks Coffee
Seattle, Washington
Satin Finish Type 304 Stainless Steel
1¹/₄"O.D., Decorative Plugged Ends, Concealed Screw Flanges
Model #RU-125/T-95/CS-1

RU-200/T-950/SF-6
RU-200/T-950/SF-6/B

TSM's StainlessConnect component system offers wall mounting (Series 300) and floor mounting (Series 500 and 550). Each series has interchangeable components for flexibility and maximum control of measurements, including corners (however, Series 300 and 500/550 are not interchangeable in 1½" O.D. components.)

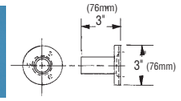


StainlessConnect for Walls (Series 300)

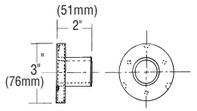
- Material: Stainless steel type 304 (18-8) satin finish.
- Tubing: 1½" O.D. x 18 gauge (38x1.2mm) or 1.9" O.D. x 16 gauge (48 x 1.7mm) with ends turned 90° by mandrel bending and heliarc welded to flanges to form a single structural unit. Wall clearance is 1½" (38mm) to meet building codes.
- Connections: Assembly of components at jobsite is with internal dowels and adhesive or welding.
- Flanges Complying With 1½" Wall Clearance:
  - R-3 Exposed Screw, 3" x 8 gauge (76x2.1mm). Three ¼" (6mm) mounting holes per flange. *Shown with 304A*
  - R-1 Exposed Screw, 3" x 14 gauge (76x9mm). Three ¼" (6mm) mounting holes per flange. *Shown with 304U*
  - CS-1 Concealed Screw, 3"x 14 gauge (76x1.9mm) base and 20 gauge cover (0.9mm), snap-lock design. Three ¼" (6mm) mounting holes per flange. *Shown with 305T2R*
  - SF-6 Exposed Screw, 4" (102mm) square x ¼" thick (6mm). Four ⅜" (9.5mm) mounting holes per flange. *See photo on page 6*
- Universal Brackets with 2½" Wall Clearance (Fit 1½" & 1.9" O.D.):
  - 304R Self-Aligning Bracket is installed with one 3/8"-16 hanger bolt through the 3" round wall flange center (76mm).
  - 304E Extruded Wall Bracket is installed with one 3/8" hex head lag screw through the 2" wide base (51mm).
  - 304C Cast Wall Bracket is installed with one 3/8"-16 hanger bolt through the 3" round wall flange center (76mm).

Universal Brackets with 2½" Wall Clearance (Fit 1½" & 1.9" O.D.)

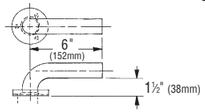
301



301/SEV



302



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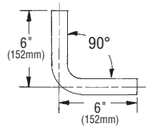
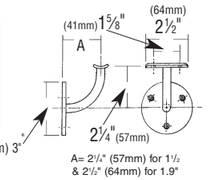
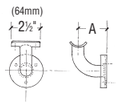


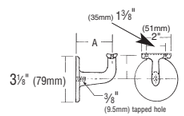
304A



304T

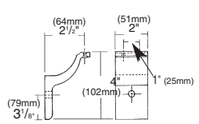


304C Cast Wall Bracket



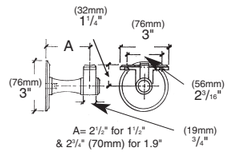
A= 2½" (64mm) for 1½"
& 3" (76mm) for 1.9"

304E Extruded Wall Bracket



A= 2½" for 1½"
& 3" (76mm) for 1.9"

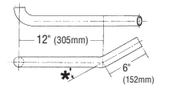
304R Self-Aligning Bracket



A= 2½" for 1½"
& 2¾" (70mm) for 1.9"

	1½" O.D. (38mm) R-3 Exposed Screw 8 ga. (4.2mm) Flanges	1½" O.D. (38mm) CS-1 Concealed Screw 14 ga. (2.1mm) Flanges	1.9" O.D. (48mm) R-3 Exposed Screw 8 ga. (4.2mm) Flanges	1.9" O.D. (48mm) SF-6 Exposed Screw ¼" Thick Flanges
301 End Wall Bracket Terminates rail into side wall.	H-301/R-3	H-301/CS-1	N/A	T-301/SF-6
301/SLEV End Wall Bracket, Sleeved Terminates rail into side wall.	H-301/SLEV/R-3	H-301/SLEV/CS-1	N/A	T-301/SLEV/SF-6
302 Return Wall Bracket Terminates rail with a sidewall return.	H-302/R-3	H-302/CS-1	N/A	T-302/SF-6
303 90° Elbow Forms inside or outside corner.	H-303	H-303	T-303	T-303
304A Underslung Support with Saddle Support is ½" rod (13mm). Attaches to tubing with set screws provided by manufacturer. Recommended spacing maximum 60" (1524mm) on center.	H-304A/R-3	N/A	T-304A/R-3	N/A
304T Underslung Support with Saddle Support is 1" O.D. tubing (25mm). Attaches to tubing with set screws provided by manufacturer. Recommended spacing maximum 60" (1524mm) on center.	H-304T/R-3	H-304T/CS-1	T-304T/R-3	T-304T/SF-6

305TL



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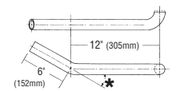

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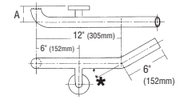

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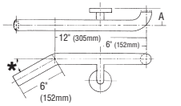

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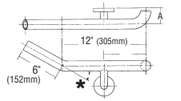

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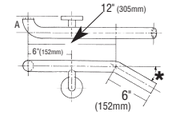

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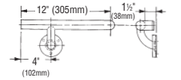

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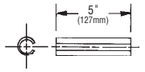

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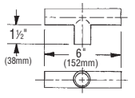

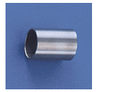

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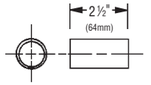

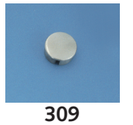

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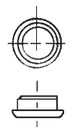
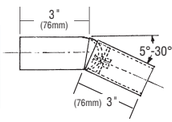
309P



310
Patent Pending

A= 2¼" for 1½" (57&38mm)
& 2½" for 1.9" (64&48mm)



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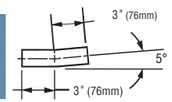
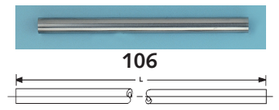


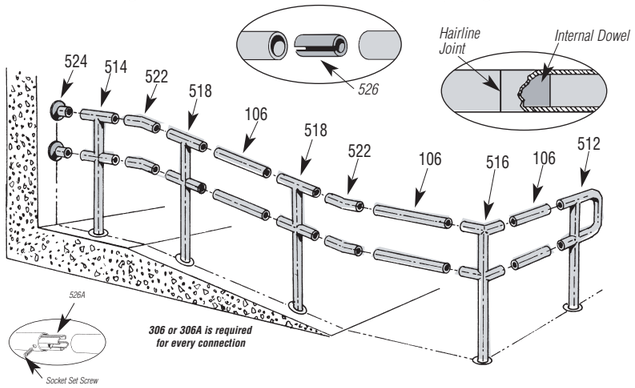


	1½" O.D. (38mm) R-3 Exposed Screw 8 ga. (4.2mm) Flanges	1½" O.D. (38mm) CS-1 Concealed Screw 14 ga. (2.1mm) Flanges	1.9" O.D. (48mm) R-3 Exposed Screw 8 ga. (4.2mm) Flanges	1.9" O.D. (48mm) SF-6 Exposed Screw ¼" Thick Flanges
305TL Wall Return Without Support, LH Returns terminate end of rail to within ¼" (6.4mm) of side wall with 309P press fit into railing to enhance appearance.	H-305TL	H-305TL	T-305TL	T-305TL
305TR Wall Return Without Support, RH Same as 305TL.	H-305TR	H-305TR	T-305TR	T-305TR
305T1L Wall Return With Support, LH Same as 305TL.	H-305T1L/R-3	H-305T1L/CS-1	T-305T1L/R-3	T-305T1L/SF-6
305T2L Wall Return With Support, LH Same as 305TL.	H-305T2L/R-3	H-305T2L/CS-1	T-305T2L/R-3	T-305T2L/SF-6
305T1R Wall Return With Support, RH Same as 305TL.	H-305T1R/R-3	H-305T1R/CS-1	T-305T1R/R-3	T-305T1R/SF-6
305T2R Wall Return With Support, RH Same as 305TL.	H-305T2R/R-3	H-305T2R/CS-1	T-305T2R/R-3	T-305T2R/SF-6
305U Underslung Support Return Wall Bracket Same as 305TL.	H-305U/R-3	H-305U/CS-1	T-305U/R-3	T-305U/SF-6
306 Internal Dowel Used to connect component pieces together; one required for every hairline joint. Adhesive sealant supplied.	H-306	H-306	T-306	T-306
307 Tee Connector Connects three component pieces, one perpendicular, two horizontal.	H-307	H-307	T-307	T-307
308 Outside Sleeve Provides attractive covering for connecting seams as well as supplying added strength to connection.	H-308	H-308	T-308	T-308
309 End Cap, Stainless Steel Spring action insert. Press fits into ends of tubing. T-309 fits only straight tubing; no curved ends.	H-309	H-309	T-309	T-309
309P End Cap, Black Plastic Heavy duty black Butyrate. Press fits into ends of tubing.	H-309P	H-309P	N/A	N/A
310 Adjustable Slope Elbow Patent pending design allows adjustment at the jobsite from 5° to 30°.	H-310	H-310	T-310	T-310
322 5° Elbow Allows adjustment for a 1:12 slope. Custom angles available.	H-322	H-322	T-322	T-322
106 Straight Tubing Standard length is 20' (6096mm). Smaller sizes can be custom cut.	H-106(49) 18 ga. (1.2mm)	H-106(49) 18 ga. (1.2mm)	T-106(65) 16 ga. (1.7mm)	T-106(65) 16 ga. (1.7mm)

* As specified

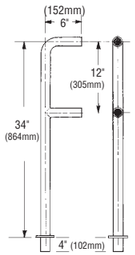
StainlessConnect for Floor Mounting (Series 500)

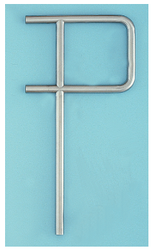
The StainlessConnect component system provides flexibility for numerous applications including safety rails, crowd control, balconies and wheelchair ramps. It is suitable for indoor as well as outdoor use. Both the StainlessConnect component system and the custom railing on page 6 are acceptable for ADA ramp applications. The 550 Picket System meets requirements that a sphere of 4" (102mm) or greater cannot pass between openings. TSM recommends maximum support spacing of 60" (1524mm) center to center.



- MATERIAL: Stainless steel type 304 (18-8) satin finish.
- TUBING: 16 gauge (1.7mm) x [1½" or 1.9" O.D. (38,48mm)].
- For models #516 and #556, tubing is miter cut @ 45° and heliarc welded to form a 90° corner. For models #510, #512, #550, #552 and #553, tubing is turned 90° by mandrel bending to preserve round shape of tubing.
- CONNECTIONS: Assembly at jobsite for all components except #566 and #568 is with internal dowels and adhesive (#526), splice lock with set screw (#526A) or welding. Picket rail is attached to posts at jobsite with ¼"-20 set screws provided by TSM.
- INSTALLATION: Same as custom floor mounted rail on page 6.

510





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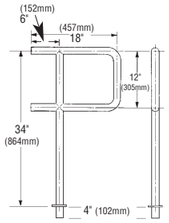

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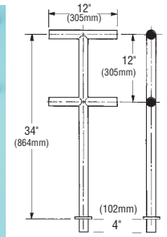

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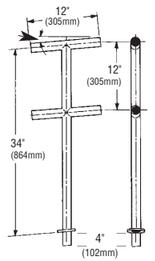

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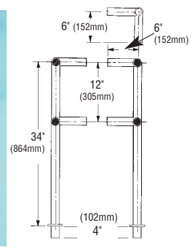

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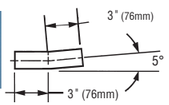

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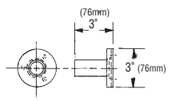

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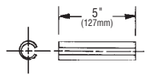

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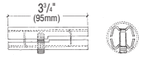
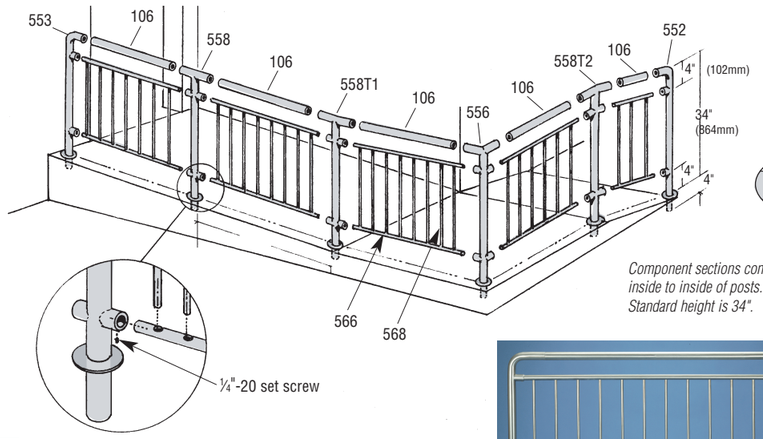


FLOOR MOUNTED COMPONENTS (Series 500)

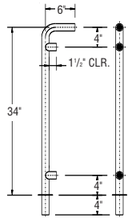
Description	1½" O.D. (38mm)	1.9" O.D. (48mm)
510 Termination Post For use with level rail at each termination end of rail.	H-510	T-510
512 Termination Post with Extension For use with level rail at each termination end or rail.	H-512	T-512
514 Intermediate Post For use with level rail.	H-514	T-514
516 90° Corner Post For use with level rails. Tubing is miter cut at 45° and heliarc welded to form a 90° corner.	H-516	T-516
518 Intermediate Sloping Post For use with graded surfaces. Slope is 1:12. Custom angles available.	H-518	T-518
522 5° Elbow Allows adjustment for a 1:12 slope. Custom angles available.	H-522	T-522
524 End Wall Bracket Terminates rail into side wall.	H-524	T-524
526 Internal Dowel Used to connect component pieces together; one required for every hairline joint. Adhesive sealant supplied.	H-526	T-526
526A Splice Lock with Set Screw Used to connect component pieces together; one required for every hairline joint. Set screw supplied. Can be removed if desired.	H-526A	T-526A

Picket Rail (Series 550)



Component sections combine to create panels 60" (1524mm) inside to inside of posts. Custom sizes are available. Standard height is 34".

550



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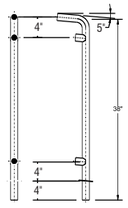

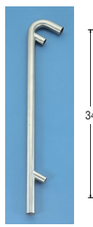

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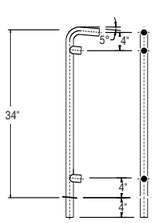

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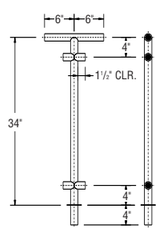

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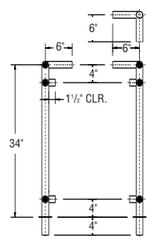

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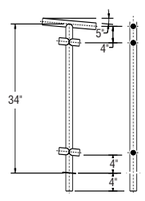

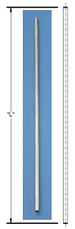

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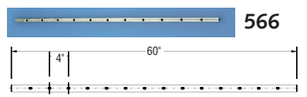
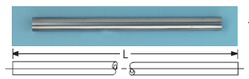


566

R-ID



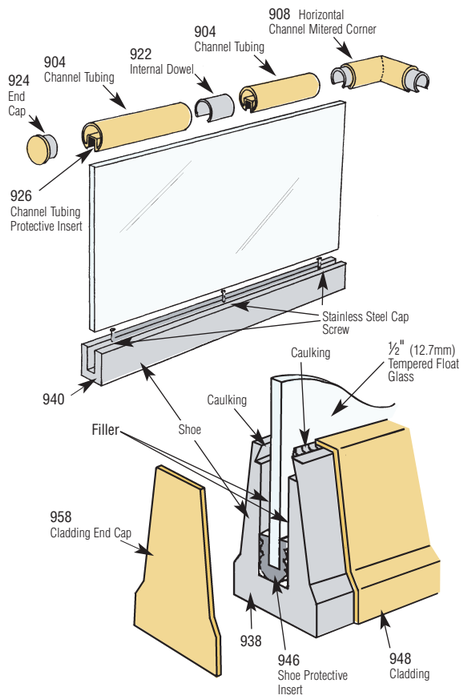
106

PICKET RAIL COMPONENTS (Series 550)

Description	1½" O.D. (38mm)	1.9" O.D. (48mm)
550 Termination Post For use with level rail at each termination end of rail.	H-550	T-550
552 Sloping End Post, Bottom Slope is 1:12. Custom angles available.	H-552	T-552
553 Sloping End Post, Top Slope is 1:12. Custom angles available.	H-553	T-553
554 Intermediate Post For use with level rail.	H-554	T-554
556 90° Corner Post For use with level rails. Tubing is miter cut at 45° and heliarc welded to form a 90° corner.	H-556	T-556
558 Intermediate Post For use with graded surfaces. Slope is 1:12. Custom angles available.	H-556	T-556
566 Perforated Tube 1" O.D. x 18 ga. (25x1.2mm) Specify for level plane or angle. If angle, 5° is standard; custom slopes available.	566	566
568 Picket ½" O.D. x 18 ga. (12.7x1.2mm)	568	568
106 Straight Tubing 16 gauge (1.7mm). Standard length is 20' (6096mm). Smaller sizes can be custom cut.	H-106	T-106
R-1D Decorative Flange Optional, for finishing purposes only. See page 6 for more installation information.	H-R-1D	T-R-1D

Glass Railing System (Series 900)

TSM's striking architectural GrandView Glass Railing system offers structural safety advantages with unobstructed views.



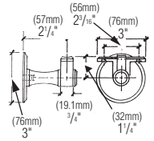
BRIGHT BRASS GLASS RAILING
#GU-304CKBB Cast Wall Bracket
#GL-904BB 2½" O.D. Channel Tubing (64mm)
#BH-106BB 1½" O.D. Handrail (38mm) *see page 19*
#H-309P Black Plastic End Cap *see page 9*
#GU-948BB Cladding and #958BB Cladding End Cap
#GU-938 Shoe

BRIGHT STAINLESS STEEL GLASS RAILING
#GU-304TKB Tubular Wall Bracket
#GT-904B 2" O.D. Channel Tubing (52mm)
#GT-924B End Cap
#H-106B/RG 1½" O.D. Bright Ripple Grip™ Handrail (38mm) *see page 19*
#H-309B End Cap *see page 9*
#GU-950B Cladding and #GU-960B Cladding End Cap
#GU-940 Shoe

GLASS HANDRAIL BRACKET KITS

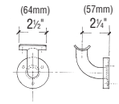
Shown in Clear Anodized Aluminum

304RK



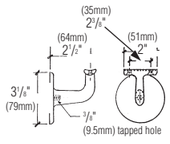
Shown in Satin Finish Stainless Steel

304TK

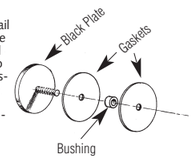


Shown in Bright Brass

304CK



All glass handrail brackets include a stainless steel back plate, two clear plastic gaskets & bushing (also available separately without brackets, model 304K)



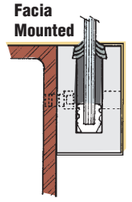
	Satin Finish Stainless Steel	Bright Finish Stainless Steel	Clear Anodized Aluminum	Satin Finish Brass	Bright Finish Brass
304RK Self-Aligning Bracket	GU-304RK	GU-304RKB	GU-304RKAA	GU-304RKSB	GU-304RKBB
304CK Cast Wall Bracket	GU-304CK	GU-304CKB	GU-304CKAA	GU-304CKSB	GU-304CKBB
304TK Tubular Wall Bracket	GU-304TK	GU-304TKB	N/A	GU-304TKSB	GU-304TKBB

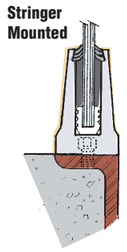
Installation

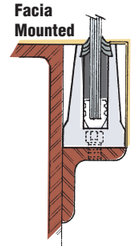
Setting Glass into Shoes: Place 6" long pieces (152mm) of shoe insert (model #946) onto glass panel at three or more equidistant locations, then lower glass into the shoe. There is space between the glass and the inside shoe walls that should have filler inserted into it to plumb and set the glass properly. The choice of filler is at the discretion of the installer (use of epoxy based fillers is not recommended.) Add caulking as needed above the filler.

Mounting Handrail Brackets onto Glass: Order glass predrilled with 5/8" (16mm) holes in glass before tempering. *(Warning: Drilling tempered glass is not recommended!)* Insert plastic bushing in hole. Slip clear plastic gasket onto back plate stud and insert in hole. Place other clear plastic gasket onto the base of the bracket and thread bracket onto stud of back plate.

Mounting Channel Tubing (Cap Rail) onto Glass: #926 Channel Tubing Protective Insert sits on top edge of glass panel between glass and cap rail. Use of a clear adhesive windshield sealer is recommended.





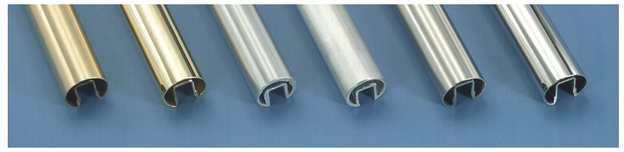


	Satin Finish Stainless Steel		Bright Finish Stainless Steel		Clean Anodized Aluminum		Satin Finish Brass		Bright Finish Brass	
	2" O.D.	2½" O.D.	2" O.D.	2½" O.D.	2" O.D.	2½" O.D.	2" O.D.	2½" O.D.	2" O.D.	2½" O.D.
904 Channel Tubing	GT-904	GL-904	GT-904B	GL-904B	GT-904AA	GL-904AA	GT-904SB	GL-904SB	GT-904BB	GL-904BB
906 Round Tubing	GT-906	GL-906	GT-906B	GL-906B	GT-906AA	GL-906AA	GT-906SB	GL-906SB	GT-906BB	GL-906BB
908 Horizontal Channel Mitered Corner	GT-908	GL-908	GT-908B	GL-908B	GT-908AA	GL-908AA	GT-908SB	GL-908SB	GT-908BB	GL-908BB
910 Vertical Channel Mitered Corner	GT-910	GL-910	GT-910B	GL-910B	GT-910AA	GL-910AA	GT-910SB	GL-910SB	GT-910BB	GL-910BB
912 Mitered Corner (no channel)	GT-912	GL-912	GT-912B	GL-912B	GT-912AA	GL-912AA	GT-912SB	GL-912SB	GT-912BB	GL-912BB
922 Internal Dowel Required for each channel connection. Slips inside to connect components. Adhesive included.	GT-922	GL-922	GT-922	GL-922	GT-922	GL-922	GT-922	GL-922	GT-922	GL-922
924 End Cap Press fits into tubing ends with or without channel.	GT-924	GL-924	GT-924B	GL-924B	GT-924AA	GL-924AA	GT-924SB	GL-924SB	GT-924BB	GL-924BB
948 Cladding Attaches to shoe with silicon, epoxy or two-way glazing tape.	GU-948	GU-948	GU-948B	GU-948B	N/A	N/A	GU-948SB	GU-948SB	GU-948BB	GU-948BB
950 Cladding Same as 948.	GU-950	GU-950	GU-950B	GU-950B	N/A	N/A	GU-950SB	GU-950SB	GU-950BB	GU-950BB
958 Cladding End Cap Same as 948. Companion to 938.	GU-958	GU-958	GU-958B	GU-958B	N/A	N/A	GU-958SB	GU-958SB	GU-958BB	GU-958BB
960 Cladding End Cap Same as 948. Companion to 940.	GU-960	GU-960	GU-960B	GU-960B	N/A	N/A	GU-960SB	GU-960SB	GU-960BB	GU-960BB

TUBING

- STAINLESS STEEL: Type 304 in satin or bright finish, 2" or 2½" O.D. (51or64mm) x 16 gauge (.065" wall).
  Channel Tubing: Length 10' (3048mm), channel depth 1½" (38mm)
  Round Tubing: Length 20' (6096mm)
- ALUMINUM: Alloy 6063T5 in clear anodized or mill finish, 1.9" O.D. x .145" wall (48x3.7mm) or 2½" O.D. x 1/8" wall (64x29mm).
  Channel Tubing: Length 20' (6096mm), channel depth 1-1/8" (29mm)
  Round Tubing: Length 20' (6096mm)
- BRASS: Alloy CDA 260 in satin or bright finish, 2" or 2½" O.D. (51or64mm) x 16 gauge (.065" wall).
  Channel Tubing: Length 10' (3048mm), channel depth 1-1/8" (29mm)
  Round Tubing: Length 12' (3658mm)

NOTE: Other tubing sizes are available, ranging from 1½"-4" O.D. (38-102mm).



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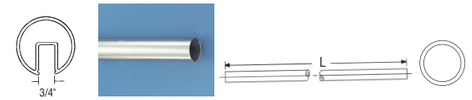

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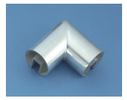

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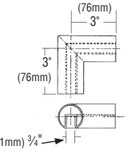

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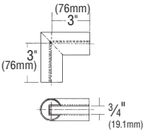

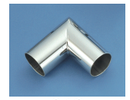

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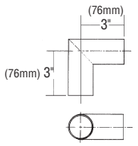

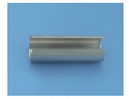

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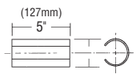

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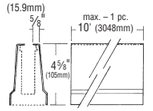

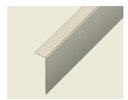

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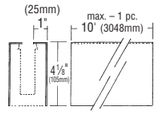

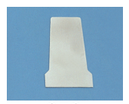

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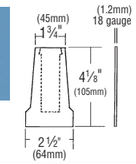

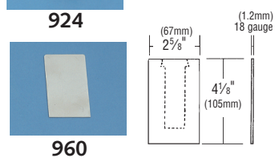

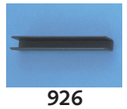

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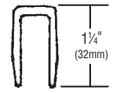

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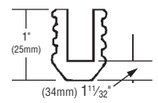

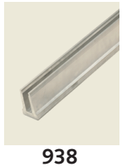

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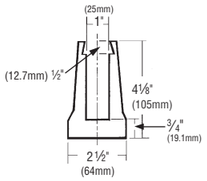

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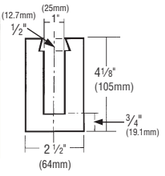
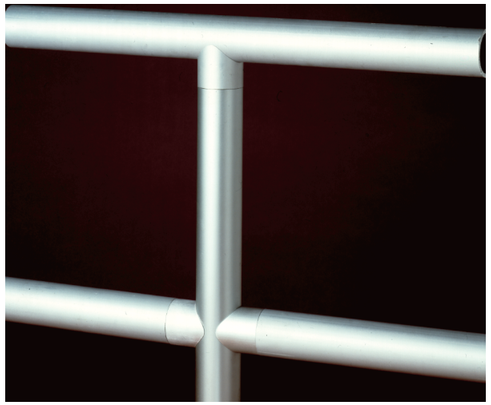


	Universal Application
926 Channel Tubing Protective Insert Rigid PVC protects glass panels inside channel tubing. Length 10' (3048mm).	GU-926
938 Shoe Aluminum alloy 6063T5. Optional hole drilling pattern accommodates ½" (12.7mm) cap screws (provided by others), 12" on center (305mm). Length 12' (3658mm).	GU-938
940 Shoe Same as 938, except lengths are 10' and 20' (3048/6096mm). Heavy Duty.	GU-940
946 Shoe Protective Insert Resilient EPDM setting block protects glass panel inside shoe.	GU-946

Aluminum Component Rail System (Series 600)

Aluminum offers a lightweight alternative to stainless steel, and TSM's AdaptaRail component system is an intelligent and adaptable connection/assembly solution for aluminum railing. The system is quick, convenient and avoids welding and grinding. In addition, AdaptaRail's internal connection system is designed to allow posts and top rails to run in continuous lengths. This provides a stronger railing system than one with cast tees and cross connections and complies with established safety standards for continuous, smooth surface rails.



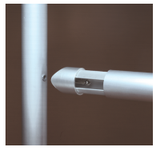
The flexibility of AdaptaRail's component assembly allows installers to cut pipe to size at the jobsite, eliminating the need for submitting precise measurements to the factory.

ALUMINUM ALLOY 6063, CLEAR ANODIZED FINISH

- 1¼" Schedule 40 Pipe
  [Tubing equivalent = 1.66" O.D. x .140" (42x3.6mm)]
- 1½" Schedule 40 Pipe
  [Tubing equivalent = 1.9" O.D. x .145" (48x3.7mm)]

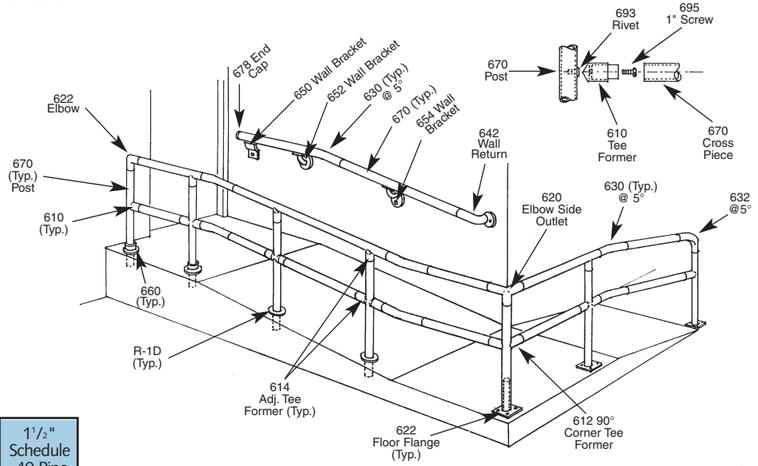
CONNECTIONS

- Concealed mechanical fasteners at intersections
- Epoxy at splice joints



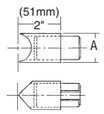
Tee Connection
Use threaded rivet and stainless steel machine screw with lock washer for forming tees.

Cross Assembly
Where two 90° tees are mounted opposite each other to form a cross assembly, a stainless steel through bolt with lock nut may be used.



Description	1¼" Schedule 40 Pipe	1½" Schedule 40 Pipe
610 90° Tee Former Requires AU-693 & AU-695 for tee connection or AU-696 for cross assembly.	AH-610	AT-610
612 90° Corner Tee Former Requires AU-693 & AU-695 for tee connection or AU-696 for cross assembly.	AH-612	AT-612
614 Adjustable Tee Former Requires AU-693 & AU-695 for tee connection or AU-696 for cross assembly.	AH-614	AT-614
616 Angle Tee Former Requires AU-693 & AU-695 for tee connection or AU-696 for cross assembly.	AH-616	AT-616
620 Elbow Side Outlet Requires epoxy for use with built-in dowel splice connections.	AH-620	AT-620
622 Elbow Mitered Requires epoxy for use with built-in dowel splice connections.	AH-622	AT-622

610



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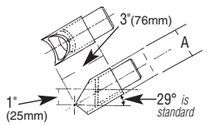

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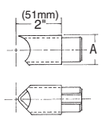

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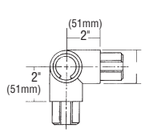

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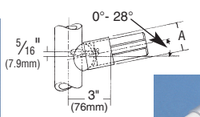

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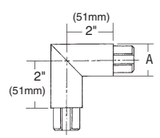

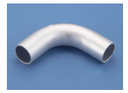
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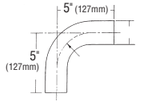

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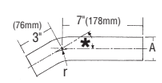

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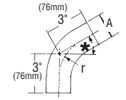

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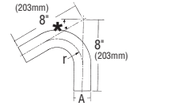

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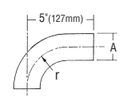

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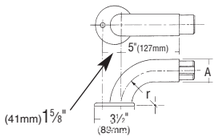

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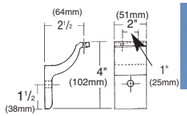

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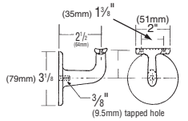

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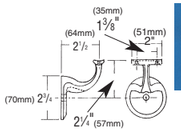

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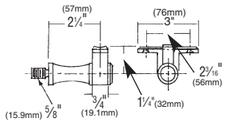

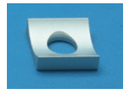
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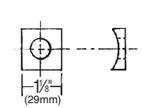

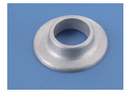
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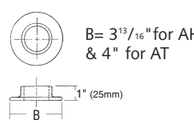

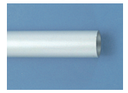
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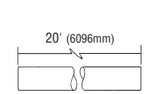

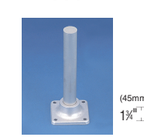
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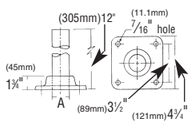

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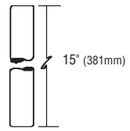

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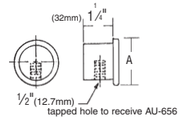

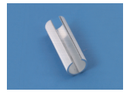
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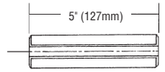


692

690A

690B

R-1D

r = 2½" radius for 1¼" Schedule 40 & 3" radius for 1½" Schedule 40
A = 1.66" for 1¼" Schedule 40 (AH) & 1.9" for 1½" Schedule 40 (AT)

693

695

696

698

Description	1¼" O.D. (38mm)	1.9 O.D. (48mm)
624 Elbow Rounded Requires dowels and epoxy for each splice connection.	AH-624	AT-624
630 Transition Elbow Specify angle desired between 5° and 180°. Requires dowels and epoxy for each splice connection.	AH-630	AT-630
632 Lower Post Elbow Same as 630.	AH-632	AT-632
634 Upper Post Elbow Same as 630.	AH-634	AT-634
640 90° Radius Wall Same as 624.		
642 Wall Return with Flange Terminates rail into side wall.	AH-642	AT-642
658 Adapter for Post Bracket Allows post bracket to fit snugly onto pipe.	AH-658	AT-658
660 Cover Flange See page 6 for installation details.	AH-660	AT-660
662 Heavy Duty Floor Flange For surface mounting. Includes 12" (305mm) Reinforcing Post Insert.	AH-662	AT-662
670 Schedule 40 Pipe	AH-670	AT-670
672 Reinforcing Post Insert Recommended for all embedded post floor mounted installations.	AH-672	AT-672
674 Internal Dowel Required for splice connections (note: many components have dowel built-in.) Serrated for pressure fit into component pipe sections. Specify with epoxy.	AH-674	AT-674
678 End Cap Press fits into end of pipe. Can be used in conjunction with 656 & 658.	AH-678	AT-678
R-1D Decorative Flange	AH-R1D	AT-R1D

Description	Universal Application
650 Wall Bracket (Extruded) Mounting hardware not included.*	AU-650
652 Wall Bracket (Cast) Mounting hardware not included.*	AU-652
654 Wall Bracket (Cast) Mounting hardware not included.*	AU-654
656 Post Bracket Includes 10/32 stainless steel set screws. Mounts to post. Can be used in conjunction with 678.	AU-656
690 Epoxy Structural Adhesive For use with dowels. AU-690A=1 qt. (.95 litre) & AU-690B=4 oz. (.12 litre)	AU-690A AU-690B
692 Manual Rivet Header	AU-692
693 Threaded Rivet Use with 695 Stainless Steel Machine Screw for forming tee.	AU-693
695 Stainless Steel Machine Screw with Lock Washer, ¼"-20 x 1" Use with 693 Threaded Rivet for forming tee.	AU-695
696 Stainless Steel Through Bolt with Lock Nut, ¼"-20 x 3" Use to form a cross assembly (two 90° tees mounted opposite each other.)	AU-696
698 Steel Sleeve Anchor Bolt 3/8" x 3" Recommended for use with 662 Floor Flange.	AU-698

**It is the installer's responsibility to select appropriate fasteners for a particular application.*

Brass Component Railing System (Series 400)

Ak-Sar-Ben

Omaha, Nebraska • Architect: Leo A. Daly • 2" O.D. Bright Finish Brass Service Bar Rail and Custom Bent Armrail and Footrail
Models #BT-458, #BT-405, #BT-415, #BT-429 and #BT-494

TSM ClassicBrass components can be combined to create upright, wall-hung, stair and ramp railings. The flexibility of the **ClassicBrass** system gives a custom look to any application. Components are simple to work with in the field, making even stairway and ramp configurations easy to install, and brass tubing is easy to cut.

An extensive offering of components that can be combined in infinite patterns is only the beginning. Beyond the full line "parts and pieces" inventory lies a complete range of custom capabilities. TSM can accommodate not only unusual bends and radii but is ready to tackle such challenges as creative welding of oversize tubing, for example. Send us your drawing for a free estimate.

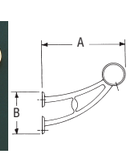
BRASS COMPONENTS AND TUBING: Brass (copper alloy - approximately 60% copper and 40% zinc). Formed construction components fit 1½" and 2" O.D. tubing (38&51mm). Chrome plating is available but is not recommended for components intended for use as footrails.

STAINLESS STEEL TUBING - Type 304 (18-8) 18 gauge (1.2mm). Available in 1½" and 2" O.D. (38 & 51mm) in a smooth bright finish and in 1½" in non-slip Ripple Grip™ bright finish.

BRASS BRACKETS

Description	1½" O.D.	A	B	2" O.D.	A	B
401 Bar Wall Bracket Footrail bracket fastens to wall. Top flange has 5/16"-18 threaded mounting hole that requires either access from back or a 3/16" pilot hole about 1" deep to be used with a hanger bolt (supplied by others). Tubing fits inside circular sleeve.	BH-401	7¼" (184mm)	4" (102mm)	BT-401	8⅜" (213mm)	4¼" (108mm)
402 Bar Wall/Floor Bracket Fastens to wall with two surface mounted screw holes; the other leg rests on the floor but is not screwed into it. Tubing fits inside circular sleeve.	BH-402	6⅜" (162mm)	7⅜" (187mm)	BT-402	7" (178mm)	7⅛" (181mm)
403 Bar Floor Bracket Fastens to floor with two surface mounted screw holes. Tubing fits inside circular sleeve.	BH-403	5¼" (133mm)	6⅞" (175mm)	BT-403	6¼" (159mm)	7" (178mm)
404 Bar Wall Bracket with Movable Leg Filigreed footrail bracket fastens to wall with four screw holes. Movable leg swings up to facilitate cleaning. Tubing fits inside circular sleeve.	BH-404	9½" (241mm)	8⅝" (219mm)	BT-404	10" (254mm)	9" (229mm)
405 Arm Rail Bracket Tubing fits inside circular sleeve bracket that fastens to underside of bar with two screw holes.	BH- 405	6⅝" (168mm)		BT-405	6⅞" (175mm)	
420G Wall Bracket, Rounded Fastens to wall with two surface mounted screw holes. Tubing fits inside circular sleeve.	N/A			BT-420G	5½" (140mm)	5½" (140 mm)
424 Center Post Has two surface mounted screw holes. Tubing fits inside circular sleeve.	BH- 424	1¾" (45mm)	3¼" (83mm)	BT-424	2¼" (57mm)	4⅜" (111mm)
424A Rounded Center Post Same as 424.	BH- 424A	3⅝" (92mm)	2¹⁵⁄₁₆" (75mm)	BT-424A	4⅜" (111mm)	3³⁄₁₆" (76mm)
425 Wall Saddle Bracket Fastens to wall with three surface mounted screw holes. Tubing attaches to bracket with set screws provided by TSM.	BH- 425	2⅝" (67mm)	3" (76mm)	BT-425	2⅝" (67mm)	3⅜" (92mm)
425G Wall Saddle Bracket, Large Same as 425.	N/A			BT-425G	3⅜" (86mm)	3½" (89mm)
426 Wall Flat Bracket Same as 425.	N/A			BT-426	1⅜" (35mm)	2½" (64mm)
431 Side Mount Bracket Same as 424 with four screws holes.	N/A			BT-431	3¼" (83mm)	3¾" (95mm)
436 Bar Straight Floor Bracket Same as 424.	BH-436	1¾" (45mm)	6¾" (172mm)	BT-436	2¼" (57mm)	9¾" (248mm)
443 Square Wall Bracket Same as 420G with four screw holes.	N/A			BT-443	7⅝" (194mm)	3" (76mm)

401



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420G

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424A

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425G

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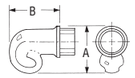

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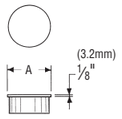

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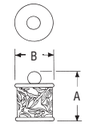

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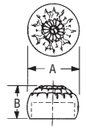

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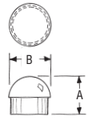

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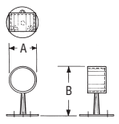

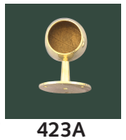
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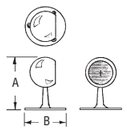

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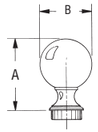

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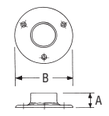

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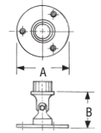

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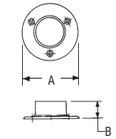

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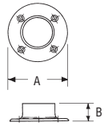

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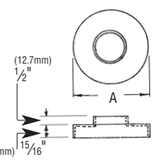

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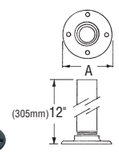

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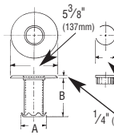

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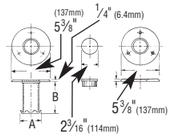


ENDS AND TOPS

	1½" O.D.	A	B	2" O.D.	A	B
406 End Scroll Scroll end fits inside tubing.	BH-406	2 3/4" (70mm)	2 3/4" (70mm)	BT-406	3" (76mm)	3" (76mm)
422 Flat End Cap End cap fits inside tubing.	BH-422	1 1/2" (38mm)		BT-422	2" (51mm)	
422A Filigree End Cap End cap slips over tubing.	BH-422A	2 7/8" (73mm)		BT-422A	2 3/8" (60mm)	
422K Decorative End Cap End cap slips over tubing.	BH-422K	1 7/8" (38mm)	1 1/8" (29mm)	BT-422K	2 3/8" (60mm)	1 1/2" (38mm)
422L Ball End Ball end slips over tubing.	BH-422L	2 7/8" (73mm)	2 3/8" (60mm)	BT-422L	3 1/4" (89mm)	2 7/8" (73mm)
422R Dome End Cap, Flush End cap fits inside tubing.	BH-422R	1 1/2" (38mm)	1 1/2" (38mm)	BT-422R	1 3/4" (45mm)	2" (51mm)
423 End Post Tubing fits inside end post. Companion to 424 (see Brass Brackets page 16).	BH-423	1 3/4" (45mm)	3 1/4" (83mm)	BT-423	2 1/4" (57mm)	4 3/8" (112mm)
423A Rounded End Post Companion to 424A (see Brass Brackets page 16).	BH-423A	3 5/8" (92mm)	2 15/16" (75mm)	BT-423A	4 3/8" (111mm)	3 3/16" (83mm)
437 Ball Finial Finial end fits inside tubing.	BH-437	3 1/2" (89mm)	2 1/4" (57mm)	BT-437	4 1/2" (114mm)	3" (76mm)

BRASS FLANGES

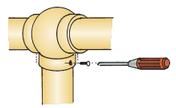
	1½" O.D.	A	B	2" O.D.	A	B
428 Wall Flange Tubing fits inside flange. To secure connection,apply adhesive to inside flange sleeve and insert tubing.	BH-428	1 1/8" (29mm)	3" (76mm)	BT-428	1 1/4" (32mm)	4" (102mm)
428A Adjustable Angle Flange Tubing slips over mounting insert. To secure connection, apply adhesive to inside of tubing end and slip over insert.	BH-428A	3" (76mm)	2 1/4" (57mm)	BT-428A	4 1/8" (128mm)	3" (76mm)
429 Floor Flange Tubing fits inside flange. To secure connection, apply adhesive to inside flange sleeve and insert tubing.	BH-429	4" (102mm)	1 1/8" (29mm)	BT-429	5" (127mm)	1 1/2" (38mm)
429C Floor Cover Plate Decorative flange. See page 6 for more information.	BH-429C	4" (102mm)		BT-429C	4 15/16" (125mm)	
429IF Iron Flange Reinforcing post provides extra stability inside brass tubing. Use in conjunction with 429C. See page 6 for more information.	BH-429IF	3 3/4" (95mm)		BT-429IF	4 1/2" (114mm)	
429S Socket & Cap for Uncarpeted Floor Allows removal of rail from concrete floor. Requires concrete floor. Drill out a 3" (76mm) area and fill in the concrete around it. Lugs welded onto brass vertical prevent the entire socket from coming out of the concrete after it's set.	N/A			BT-429S	3" (76mm)	4 1/2" (114mm)
429SC Socket & Cap for Carpeted Floor Same as 429S.	N/A			BT-429SC	3" (76mm)	4 1/2" (114mm)
430 Heavy Duty Floor Flange Same as 429.	BH-430	5 1/4" (133mm)	1" (25mm)	BT-430	7" (178mm)	1 1/2" (38mm)

INSTALLATION

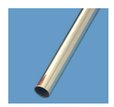
In-wall backing is required. TSM recommends supports every 48" for upright rails and every 36° for footrails (1219 and 914mm). It is important to comply with local codes in mounting railings, for the national codes vary widely in their recommendations [from 30°-38° (762-973mm)] above floor level. Align brackets with tubing, then use flanges as a template to pinpoint mounting hole placement. Pre-drill pilot holes and lubricate screws provided by TSM with soap. Attach tubing to brackets using set screws or adhesive provided by TSM. While TSM provides 1 1/2" brass wood screws with Series 400 compnents, it is the installer's responsibility to select fasteners that are appropriate for the wall condition and application. Mounting holes in flanges are countersunk.

For set screw connections: Drill through component and tubing with bit and thread tubing or component (whichever is closest) with tap.

For adhesive connections: Apply bead inside female component openings and insert dowels to form a hairline joint. Adhesive can be used in conjunction with set screws for extra strength.



The natural beauty of the brass finish is maintained by regular, frequent cleaning and polishing.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106B/RG

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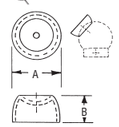

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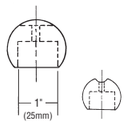

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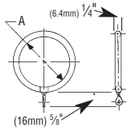

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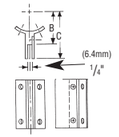

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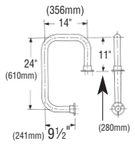

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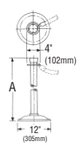

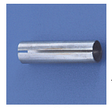
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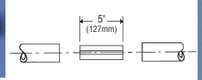

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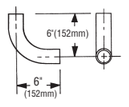

106B

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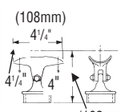

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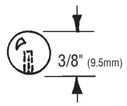

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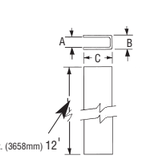

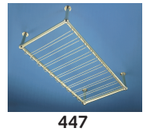
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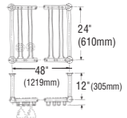

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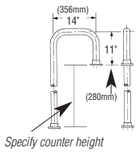
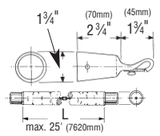


460B
460C



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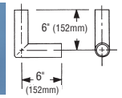

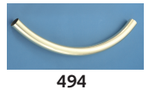
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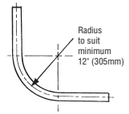


BRASS & STAINLESS STEEL TUBING

	1½" O.D.	2" O.D.
106BB Brass Tubing, Bright Finish 12' (3658mm) maximum length. Can be custom cut.	BH-106BB	BT-106BB
106B Stainless Steel Tubing, Bright Finish 20' (6096mm) maximum length. Can be custom cut. Looks like chrome.	H-106B	T-106B
106B/RG Stainless Steel Tubing, Bright Finish Ripple Grip Non-Slip Finish. Same as 106B.	H-106B/RG	N/A

ANGLE AND TUBING ADAPTERS

	1½" O.D.	2" O.D.
427 Angle Adapter/Collar Used to create proper angle on stair railing. Position adapter at angle required on ball fitting (can be used from 90° to 180°) and attach with machine screws provided by manufacturer. A = 1 3/4" (45mm) for BH & 2-3/16" (56mm) for BT. B = 7/8" (22mm) for BH & 1" (25mm) for BT.	BH-427	BT-427
432 Adjustable Saddle Tubing slips over insert. To secure connection, apply adhesive to inside of tubing and slip over insert.	N/A	BT-432
434 2" to 1" Tubing Adapter Connection adapts 2" O.D. tubing to 1" O.D. perpendicular (51 to 25mm). Position adapter at angle required on 2" (51mm) tubing and attach with machine screw provided by manufacturer. 1" tubing (25mm) fits inside adapter.	N/A	BT-434
448 Diameter Ball Performs same function as a cap nut to cover 3/16" (5mm) exposed threaded rod, but in a decorative manner.	BU-448	BU-448

MISC. ITEMS AND ACCESSORIES

	1½" O.D.	2" O.D.
435 Curtain Ring	BH-435	BT-435
445 Glass Channel *	BU-445	BU-445
446 Glass Clip Same use as 445. Attaches to tubing and removable panel tightens against glass. Accommodates glass 1/4" (6mm) thick. Can be used with or without 445. Secure to tubing using four 1/4" (6mm) x 8/32 pan head brass machine screws provided by TSM. Remove side panel of clip, insert glass and tighten panel to hold glass securely. B = 1-3/8" (35mm) for BH & 1-5/8"for BT. C = 2-3/16" (56mm) for BH & 2-7/16" (62mm) for BT.	BH-446	BT-446
447 Stemware Rack Provides 10 lanes to hold wine glasses.	BH-447	N/A
458 Service Bar Rail Separates area of bar that is not to be used by customers.	BH-458	BT-458
459 Waitress Station Separates area of bar that is not to be used by customers.	BH-458	BT-458
460 Crowd Control Post Useful anywhere queues form. Easy set-up and dismantling allows instant adaptation to fluctuations in crowd size. A = 42 1/2"-44" (1080-1118mm).	N/A	BT-460
460B Snap Rope End Screws secure ends of rope inside fittings.	BH-460B	N/A
460C Velour Rope Gold, green, blue and brown. Standard length is 7' (2134mm) between posts; shorter lengths can be custom cut (indicate post-to-post dimension only, as TSM will allow for slack.) Rope fits snugly in sleeve of 460B.	BH-460C	N/A
490 Internal Dowel with Adhesive Used to connect component pieces together; one required for every hairline joint. Adhesive sealant supplied.	BH-490	BT-490
491 90° Mitered Corner Elbow	BH-491	BT-491
493 90° Mandrel Radius Bend Elbow	BH-493	BT-493
494 Custom Radius Bend Custom angles and radii are available.	BH-494	BT-494

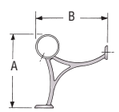
* Used to frame glass panels with brass tubing for salad bar sneeze guards, booth privacy panels, etc. Can fit any size tubing and accommodates glass 1/4" (6mm) thick. Can be used with or without 446. TSM recommends that glass channel be attached in the field with set screws. Drill holes through the tubing and channel approximately every 12" (305mm), then tap all tubing holes where the channel is to be attached. Do not tap the channel, or it will not be possible to tighten the tubing and channel together. Tap the tubing only! Align the channel and tubing holes and insert set screws provided by TSM. Do not overtighten or the threads in the tubing will strip. A second method for attaching glass channel is to instruct the factory to weld the channel to the tubing. This is more costly than set screws and requires precise drawings detailing where the channel is to be attached. TSM welds the channel to the tubing approximately every 12" (305mm) on both sides. A = 1/4" (6mm). B & C = 3/8" (9.5mm).

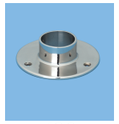
Stainless Steel Component Railing System (Series 400)

TSM **Series 400** components are similar in appearance and function to Series B-400 Classic Brass on pages 3-6.

STAINLESS STEEL COMPONENTS AND TUBING: Type 304 600 grit stainless steel. Cast construction components fit 1½" and 2" O.D. tubing (38 & 51mm). Available in satin finish; add suffix 'S' to model numbers.

402

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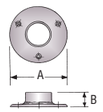

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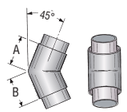

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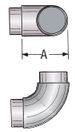

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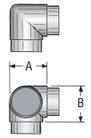

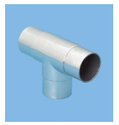
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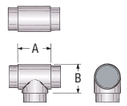

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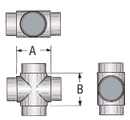

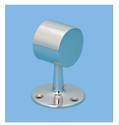
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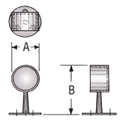

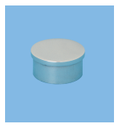
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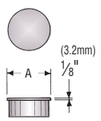

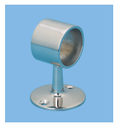
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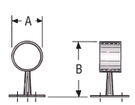

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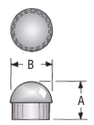

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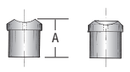

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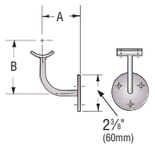

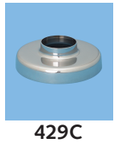
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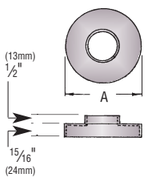

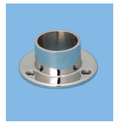
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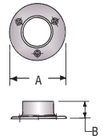

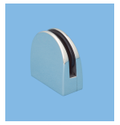
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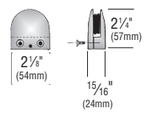

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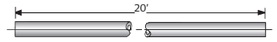
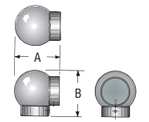


STAINLESS STEEL SERIES 400 COMPONENT MODEL NUMBERS

Description	1½" O.D.	A	B	2" O.D.	A	B
106 Tubing 18 gauge (1.2mm). 20' (610cm) maximum length. Can be custom cut.	H-106(49)/ 600G			T-106(49)/ 600G		
402 Bar Wall/Floor Bracket Fastens to wall with two surface mounted screw holes; the other leg rests on the floor but is not screwed into it. Tubing fits inside circular sleeve.	H-402	6 3/8" (162mm)	7 3/8" (187mm)	T-402	7" (178mm)	7 1/8" (181mm)
409 Flush Angle @ 135° Angle ends fit inside tubing.	H-409	1 1/4" (32mm)	1 1/4"	T-409	2" (51mm)	2"
410 Flush Elbow, Rounded Elbow ends fit inside tubing.		H-410 (70mm)	2 3/4"		BT-410 (76mm)	3"
412 Flush Elbow Side Outlet Elbow ends fit inside tubing.	H-412	1 7/8" (48mm)	1 7/8"	T-412	2 1/4" (57mm)	2 1/4"
415F Flush Tee Tee ends fit inside tubing.	H-415F	1 15/16" (49mm)	1 3/4" (45mm)	T-415F	2 7/16" (62mm)	2 1/4" (57mm)
416F Flush Cross Cross ends fit inside tubing.	H-416F	1 15/16" (49mm)	1 15/16" (49mm)	T-416F	2 1/2" (64mm)	2 1/2" (64mm)
422 Flat End Cap End cap fits inside tubing.	H-422	1 1/2" (38mm)		T-422	2" (51mm)	
422R Dome End Cap, Flush End cap fits inside tubing.	H-422R	1 1/2" (38mm)	1 1/2"	T-422R	1 3/4" (45mm)	2" (51mm)
423 End Post Tubing fits inside end post. Companion to 424.	H-423	1 3/4" (45mm)	3 1/4" (83mm)	T-423	2 1/4" (57mm)	4 3/8" (112mm)
424 Center Post Has two surface mounted screw holes. Tubing fits inside circular sleeve.	H- 424	1 3/4" (45mm)	3 1/4" (83mm)	T-424	2 1/4" (57mm)	4 3/8" (111mm)
425 Wall Saddle Bracket Fastens to wall with three surface mounted screw holes. Tubing attaches to bracket with set screws provided by TSM.	H- 425	2 5/8" (67mm)	3" (76mm)	T-425	2 5/8" (67mm)	3 3/8" (92mm)
427 90° Tee Former Used to create proper angle on stair railing. Position adapter at angle required on ball fitting (can be used from 90° to 180°) and attach with machine screws provided by TSM. A = 1 1/2" for H & 1 3/4" for T (38 & 45mm).	H-427			T-427		
428 Wall Flange Tubing fits inside flange. To secure connection, apply adhesive to inside flange sleeve and insert tubing.	H-428	1 1/8" (29mm)	3" (76mm)	T-428	1 1/4" (32mm)	4" (102mm)
429 Floor Flange Tubing fits inside flange. To secure To secure connection, apply adhesive to inside flange sleeve and insert tubing.	H-429	1 1/8" (29mm)	4" (102mm)	T-429	1 1/2" (38mm)	5" (127mm)
429C Floor Cover Plate Decorative flange.	H-429C	4" (102mm)		T-429C	4 15/16" (125mm)	
446 Glass Grip Attaches to tubing and removable panel tightens against glass. Accommodates glass 1/4" - 3/8" (6-9.5mm) thick. Secure to tubing using four 1/4" x 8/32 pan head machine screws provided by TSM. Remove side panel of clip, insert glass and tighten panel to hold glass securely.	F-446			T-446		

BALL ELBOWS & TEES

Description	1½" O.D.	A	B	2" O.D.	A	B
414 Ball Elbow Elbow ends slip over tubing.	H-414	2 3/4" (70mm)	2 3/4" (70mm)	T-414	3 3/8" (86mm)	3 3/8" (86mm)
415 Ball Tee Tee ends slip over tubing.	H-415	3" (76mm)	2 3/4" (70mm)	T-415	3 5/8" (92mm)	3 1/4" (83mm)
416 Ball Cross Same as 415S except side connections are at 90°.	H-416	2 3/4" (70mm)	2 7/16" (62mm)	T-416	3 5/8" (92mm)	2 15/16" (75mm)
417 Ball Elbow Side Outlet Elbow ends slip over tubing.	H-417	2 3/4" (70mm)	2 3/4" (70mm)	T-417	3 3/8" (86mm)	3 3/8" (86mm)
418 Ball Tee Side Outlet Same as 416.	H-418	2 5/8" (67mm)		T-418	3 1/4" (83mm)	
422L Ball End Ball end slips overs tubing.	H-422L	2 7/8" (73mm)	2 3/8"	T-422L (60mm)	3 1/4"	2 7/8" (73mm)



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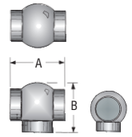

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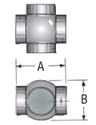

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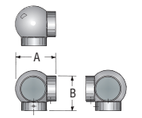

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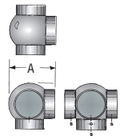

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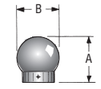

422L

TSM Guide Specifications

The following brief guide specifications must be edited to fit specific job requirements.

[SECTION 05520 - Handrails and Railings]
[SECTION 05521 - Pipe Railings]
[SECTION 05720 - Ornamental Handrails and Railings]

PART 1 -- GENERAL

1.01 Work Included

A. Furnish and install [standard component,] [custom fabricated,]; [stainless steel] [aluminum] [brass] [bronze] [glass]; [railing system] [handrails] [guardrails].

1.02 System Performance Requirements

A. Check governing codes for requirements. Railings shall meet or exceed the requirements of all applicable building codes and the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

B. Provide handrails, guardrails and railing systems from one source to assure consistent quality and appearance.

1.03 Submittals

A. Submit shop drawings and product data under provision of Section [01300] [01340].

B. Indicate materials, finishes, dimensions, joining methods, product details and the relationship to adjoining work.

C. Submit manufacturer's installation instructions under provisions of Section [01300] [01340].

1.04 Delivery, Storage and Handling

A. Deliver materials in protective packaging to avoid damage to the material and finished surfaces.

B. Store material properly to avoid damage from abrasion, moisture and other construction activities.

C. Avoid excessive handling of material at the job site.

PART 2 -- PRODUCTS

2.01 Manufacturer

Provide [railing systems] [handrails] [guardrails] manufactured by **Tubular Specialties Mfg., Inc. (TSM)**, head office located at 13011 South Spring Street, Los Angeles, CA 90061-1685, phone **800-CALL TSM** (800-225-5876) and 310-515-4801, fax 310-217-0653, e-mail tsm@calltsm.com, web-site www.calltsm.com.

2.02 Material and Finishe

A. Provide materials free from surface blemishes where exposed to view in the finished installation.

B. Stainless Steel: (1). Welded Tubing or Pipe: [Type 304] [Type 316] meeting [ASTM A-554] [ASTM A-269] (2). Bars, Shapes and Moldings: Type 304 meeting ASTM A-276 (3). Finish: [Satin Finish, AISI No. 4] [Bright Finish, AISI No. 8] [AISI No. ____].

C. Aluminum: (1). Extruded Tubing or Pipe: Alloy 6063 – T52 meeting ASTM B-221 (2). Reinforcing Bars: Alloy 6061-T6 meeting ASTM B-221 (3). Extruded Bars, Shapes and Moldings: Alloy 6063-T52 meeting ASTM B 221 (4). Finish: [Anodized finish shall be Mill Finish Anodized [AA-M10-C22-A31 (204R1)] [Clear Brushed Anodized (light circumferentially brushed finish before anodizing) (AA-M32-C22-A41)] [Powdercoated finish shall be ____ type and ____ color].

D. Copper Alloys: (1). Drawn/Welded Tube or Pipe: [Yellow Brass, Alloy CDA 260] [Red Brass, Alloy CDA 230] [Architectural Bronze, Alloy CDA 385] (2). Castings: [CDA 865 meeting ASTM B 584 for sand castings] (3). Extrusions: [CDA 385 (Architectural Bronze) meeting ASTM B 455] (4). Finish: [Satin Finish, AISI No. 4] [Bright Finish, AISI No. 8] [AISI No. ____] [with oven baked clear coat].

2.03 Railing System

A. Material shall conform to 2.02.__ __ and be finished in accordance with 2.02. __ __. Railing system to be TSM no. _____.
Select railing systems from options below (for details of each railing system see the appropriate section in this catalog :

Series GRD: Custom Railing and Architectural Metalwork in [Stainless Steel] [Aluminum] [Brass] [Bronze].

Series 300: Stainless Steel Component Wall Rail System.

Series 400: Brass Component Wall and Floor Mounted Rail System.

Series 500: Stainless Steel Component Floor Mounted Rail System.

Series 550: Stainless Steel Picket Rail System.

Series 600: Aluminum Component Wall and Floor Mounted Rail System.

Series 900: Glass Rail System components in [Stainless Steel] [Aluminum] [Brass].

Series RU: Custom Wall Rail System in [Stainless Steel] [Aluminum] [Brass] [Bronze].

Series U-Line: Custom Floor Mounted Rail System in [Stainless Steel] [Aluminum] [Brass] [Bronze].

2.04 Handrail Brackets

A. [Stainless steel] [Aluminum] [Brass] [Bronze]

B. [Extruded] [Cast] [Self-Aligning] [Tubular] [Underslung]

C. TSM No. _____

2.05 Fabrication

A. Field verify dimensions prior to shop fabrication of custom work.

B. Employ smooth curves by bending the material or by using radius elbows as opposed to miter and weld, as much as possible.

C. Remove all burrs from all exposed edges.

D. Make exposed hairline joints butt tight and flush.

E. Use appropriate end cap to close exposed open ends of [tube] [pipe] [handrail].

F. For posts set in concrete, furnish 4" - 6" long sleeves. [Furnish decorative flange TSM No. __ for each embedded post].

PART 3 -- EXECUTION

3.01 Examination/Preparation

A. Examine railing system components and installation site conditions. Notify in writing if either is unsatisfactory.

B. Ensure availability of items to be [cast in concrete] [embedded in masonry] [placed in partitions].

3.02 Installation

A. Install work in accordance with final shop drawings and manufacturer's instructions.

B. Erect work [plumb] [square and level,] [horizontal or parallel to the slope of steps or ramp,] [and] free from distortion or defects detrimental to appearance or performance.

3.03 Cleaning

A. Upon completion of installation, wipe railing with a wet soft cloth (rag) or wash thoroughly using water and soap or a mild detergent. Do not use harsh chemicals such as acid solutions or harsh abrasives such as steel wool.

3.04 Repair of Defective Work

A. Remove defective or damaged work and replace with material that meets specification requirements.

TSM *Guide Specifications*

The following brief guide specifications must be edited to fit specific job requirements. For complete guide specifications please see TSM's listing in Sweet's CD.

[SECTION 05520 - Handrails and Railings]
[SECTION 05521 - Pipe Railings]
[SECTION 05720 - Ornamental Handrails and Railings]

PART 1 -- GENERAL

1.01 Work Included

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1.02 System Performance Requirements

A. Check governing codes for requirements. Railings shall meet or exceed the requirements of all appli cable building codes and the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

B. Provide handrails, guardrails and railing systems from one source to assure consistent quality and appearance.

1.03 Submittals

A. Submit shop drawings and product data under provision of Section [01300] [01340].

B. Indicate materials, finishes, dimensions, joining methods, product details and the relationship to adjoining work.

C. Submit manufacturer's installation instructions under provisions of Section [01300] [01340].

1.04 Delivery, Storage and Handling

A. Deliver materials in protective packaging to avoid damage to the material and finished surfaces.

B. Store material properly to avoid damage from abrasion, moisture and other construction activities.

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C. Aluminum: (1). Extruded Tubing or Pipe: Alloy 6063 – T52 meeting ASTM B-221 (2). Reinforcing Bars: Alloy 6061-T6 meeting ASTM B-221 (3). Extruded Bars, Shapes and Moldings: Alloy 6063-T52 meeting ASTM B 221 (4). Finish: [Anodized finish shall be Mill Finish Anodized [AA-M10-C22-A31 (204R1)] [Clear Brushed Anodized (light cir cumferentially brushed finish before anodizing) (AA-M32-C22-A41)] [Powder coated finish shall be ____ type and ____ color].

D. Copper Alloys: (1). Drawn/Welded Tube or Pipe: [Yellow Brass, Alloy CDA 260] [Red Brass, Alloy CDA 230] [Architectural Bronze, Alloy CDA 385] (2). Castings: [CDA 865 meeting ASTM B 584 for sand castings] (3). Extrusions: [CDA 385 (Architectural Bronze) meeting ASTM B 455] (4). Finish: [Satin Finish, AISI No. 4] [Bright Finish, AISI No. 8] [AISI No. ____] [with oven baked clear coat].

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Series 300: Stainless Steel Component Wall Rail System.

Series 400: Brass Component Wall and Floor Mounted Rail System.

Series 500: Stainless Steel Component Floor Mounted Rail System.

Series 550: Stainless Steel Picket Rail System.

Series 600: Aluminum Component Wall and Floor

MOUNTED RAIL SYSTEM.

Series 900: Glass Rail System components in [Stainless Steel] [Aluminum] [Brass].

Series RU: Custom Wall Rail System in [Stainless Steel] [Aluminum] [Brass] [Bronze].

Series U-Line: Custom Floor Mounted Rail System in [Stainless Steel] [Aluminum] [Brass] [Bronze].

2.04 Handrail Brackets

A. [Stainless steel] [Aluminum] [Brass] [Bronze]

B. [Extruded] [Cast] [Self-Aligning] [Tubular] [Underslung]

C. TSM No. _____

2.05 Fabrication

A. Field verify dimensions prior to shop fabrication of custom work.

B. Employ smooth curves by bending the material or by using radius elbows as opposed to miter and weld, as much as possible.

C. Remove all burrs from all exposed edges.

D. Make exposed hairline joints butt tight and flush.

E. Use appropriate end cap to close exposed open ends of [tube] [pipe] [handrail].

F. For posts set in concrete, furnish 4" - 6" long sleeves. [Furnish decorative flange TSM No. __ for each embedded post].

PART 3 -- EXECUTION

3.01 Examination/Preparation

A. Examine railing system components and installation site conditions. Notify in writing if either is unsatisfactory.

B. Ensure availability of items to be [cast in concrete] [embedded in masonry] [placed in partitions].

3.02 Installation

A. Install work in accordance with final shop drawings and manufacturer's instructions.

B. Erect work [plumb] [square and level,] [horizontal or parallel to the slope of steps or ramp,] [and] free from distortion or defects detrimental to appearance or performance.

3.03 Cleaning

A. Upon completion of installation, wipe railing with a wet soft cloth (rag) or wash thoroughly using water and soap or a mild detergent. Do not use harsh chemicals such as acid solutions or harsh abrasives such as steel wool.

3.04 Repair of Defective Work

A. Remove defective or damaged work and replace with material that meets specification requirements.

OTHER PRODUCTS OFFERED

In addition to railing systems, TSM offers an extensive line of other products listed below:

Division 10260:	Corner Guards - Stainless Steel and Lexan
Division 10800:	Washroom Accessories - Grab Bars, Shower Seats, etc.
Division 11400:	Food Service Equipment - Sneeze Guards, Wine Racks
Division 13152:	Pool Ladders and Rails

Warehouses in California, New Jersey and Washington

For more information, request Catalog 803

Guarantee

TSM guarantees its products against defects in workmanship and materials for one year from shipping date.

TUBULAR SPECIALTIES MANUFACTURING, INC.

13011 South Spring Street • Los Angeles, CA 90061-1685, USA
e-mail: tsm@calltsm.com • http://www.calltsm.com
Toll Free: 800/CALL TSM (800/225-5876) • 310/515-4801 • Fax 310/217-0653