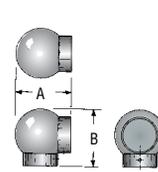
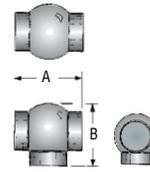


BALL ELBOWS & TEES

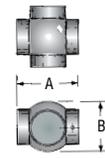
Description	1½" O.D.	A	B	2" O.D.	A	B
414 Ball Elbow Elbow ends slip over tubing.	H-414	2¾" (70mm)	2¾" (70mm)	T-414	3⅝" (86mm)	3⅝" (86mm)
415 Ball Tee Tee ends slip over tubing.	H-415	3" (76mm)	2¾" (70mm)	T-415	3⅝" (92mm)	3¼" (83mm)
416 Ball Cross Same as 4155 except side connections are at 90°.	H-416	2¾" (70mm)	2⅞" (62mm)	T-416	3⅝" (92mm)	2⅞" (75mm)
417 Ball Elbow Side Outlet Elbow ends slip over tubing.	H-417	2¾" (70mm)	2¾" (70mm)	T-417	3⅝" (86mm)	3⅝" (86mm)
418 Ball Tee Side Outlet Same as 416.	H-418	2⅝" (67mm)		T-418	3¼" (83mm)	
422L Ball End Ball end slips over tubing.	H-422L	2⅞" (73mm)	2⅝" (66mm)	T-422L	3¼" (83mm)	2⅞" (73mm)



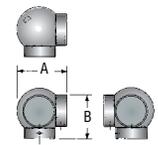
414



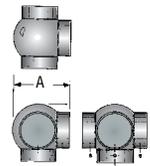
415



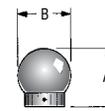
416



417



418



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 Finishes

- 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.