SECTION 05 73 00

DECORATIVE METAL AND GLASS RAILING

PART 1- GENERAL

1.1 SUMMARY

A) This section includes both standard and custom handrails as shown in the contract drawings.
B) These include aluminum, stainless steel and bronze glass railing, aluminum, stainless steel and bronze picket railing, aluminum, stainless steel and bronze cable railings and aluminum, stainless steel and bronze custom railings.
C) Related Section 05 52-00- Aluminum and Stainless Steel Pipe and Tube Railings

1.2 REFERENCES

A) ASTM B209- Standard Specification for aluminum sheet and plate
B) ASTM B210- Standard Specification for aluminum drawn seamless tube
C) ASTM B221- Standard Specification for aluminum extruded bars, rods, tubes and channel
D) ASTM B429- Standard Specification for aluminum structural pipe and tube
E) ASTM A167- Standard Specification for stainless and heat resisting chromium nickel steel plate, sheet and strip
F) ASTM A269- Standard Specification for seamless and welded austenitic stainless steel tubing
G) ASTM A276- Standard Specification for stainless and heat resisting bars and shapes
H) ASTM A312- Standard Specification for seamless and welded austenitic stainless steel pipe
I) AWS D1.1- Structural Welding Code Steel; 2008
J) AWS D1.2- Structural Welding Code Aluminum; 2003
K) AWS D1.6- Structural Welding Code Stainless Steel; 2007
L) AWS B2.1-84- Welding procedure and performance calculations
M) ASTM E894- Standard Test Methods for anchorage of permanent metal railing systems and rails for buildings
N) ASTM E935- Standard Test Methods for performance of permanent metal railing systems and rails for buildings
O) ASTM E985- Specifications for permanent metal railing systems and rails for buildings
P) NOMMA- Metal finishes manual
Q) AA DAF-45- Aluminum Association designation system for aluminum finishes
R) AA SAA-46- Aluminum Association standards for anodized architectural aluminum
S) AAMA 605.1- Specification for high performance organic coatings on architectural extrusions and panels
T) AAMA 606.1- Voluntary guide specifications and inspection methods of integral color anodic finishes for architectural aluminum
U) AAMA 607.1- Voluntary guide specifications and inspection methods for clear anodic finishes for architectural aluminum
V) IBC 2407.1.2: Support- Each glass run shall be supported by a minimum of three panels or to remain in place should one panel fail. Glass panels shall not be installed without handrail or guard.
W) ASTM C1036-06- Dimensional tolerance for rectangular shapes of Type 1 transparent flat glass
X) ASTM C1048- Standard Specification for heat treated flat glass; 2004
Y) ASTM C1172- Standard Specification for laminated architectural flat glass; 2003

1.3 PERFORMANCE REQUIREMENTS

A) Handrail shall be designed to withstand without permanent deflection the following loads:
   a) Top Rail-
      (1) Concentrated load of 200 lb/ft applied at any point and any direction.
      (2) Uniform load of 50 lb/ft applied horizontally and concurrently with uniform load of 100 lb/ft applied vertically downward.
      (3) Concentrated and uniform loads above need not be assumed to act concurrently.
   b) Hand Rails other than top rail-
      (1) Concentrated load of 200 lb/ft applied at any point and any direction.
      (2) Uniform load of 50 lb/ft applied in any direction.
      (3) Concentrated and uniform loads above need not be assumed to act concurrently
   c) Infill areas-
      (1) Concentrated horizontal load 50 lb/ft applied to 1 sq. ft. at any point is system, including intermediate rails, panels, pickets, cables or other elements making up infill area. Loads need not be assumed to act concurrently with loads on top rails in determining stress on infill.

1.4 SUBMITTALS

A) Shop drawings which specify material sizes, shapes, plans, sections, install details and finishes per requirements.
B) Product data for rail systems and finishes.
C) Welder certifications.
D) Samples of rail materials and finish.
E) Mock ups as required (pricing available on request).
F) Structural calculations and testing (pricing available on request).
G) LEED submittals as applicable for each different product or component which contains recycled content for inclusion in documentation for LEED MR Credit.
H) One year manufacturer's warranty for materials and installation at project completion.
I) Forward warranty on finish; when applicable; to owner at project completion.

1.5 QUALITY ASSURANCE

A) Obtain railing through one source from a single manufacturer.
B) Check dimensions of other construction by accurate field measurements before fabrication to insure proper rail fit up. Incorporate final dimensions into field use shop drawings. Coordinate fabrication lead times with construction progress to avoid delaying the work.
C) Shop assembled mechanical joints shall fit to within 1/16".
D) Expansion joints shall fit within 1/8" to allow for thermal expansion within the handrail.
E) Railing posts shall be plumb to within 1/8" over 3'-0'.
F) Qualify welders and procedures per AWS standard qualification procedures.

1.6 DELIVERY, STORAGE AND HANDLING

A) Materials to be delivered to job site crated and packaged to prevent damage.
B) Store material on site in manufacturers unopened packaging until ready to install.
C) Store material in a clean dry location avoiding exposure to uncured concrete, masonry or acidic cleaning agents.

PART 2 –PRODUCTS

2.0 MANUFACTURER

A) Obtain railing systems from Tri Tech, Inc., 5710 Harrison Avenue, Austell, GA 30106. Toll free 800-941-5504. Website http://www.tritechhandrails.com

2.1 MATERIALS

A) Provide metal free from pitting, seam marks, roller marks, grinding marks and stains at areas exposed to view on completed rail units.
   a) Aluminum
      (1) Extruded pipe: ASTM B 221 alloy 6063-T6.
      (2) Extruded tube: ASTM B 221 alloy 6063-T6.
      (3) Extruded bar, plate and sheet: ASZTM B 221 alloy 6061-T6/T52.
      (4) Castings: ASTM B 26 Almag 35.

   b) Stainless Steel
      (1) Pipe and tubing: ASTM A 269 Type 304 or Type 316.
      (2) Bar: ASTM A 276 Type 304 or Type 316.
      (3) Fittings: ASTM A 276/ A 479 Type 304 or Type 316.
      (4) Cables: MIL-W-87161, Type II, Composition B 3/16" diameter or as required (Type 316) 1 X 19 strand.
   c) Copper Alloys
      (1) Bronze extrusions: ASTM B 455 C38500
      (2) Bronze castings: ASTM B 584 C86500
      (3) Brass pipe: ASTM B 43 C23000
   d) Tempered Glass
      (1) ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type 1 (transparent flat glass), Quality R3. Provide products that have been tested for surface and edge compression according to ASTM C 1048 and for impact strength according to 16 CFR 1201 for Category II materials. Thickness as required for structural loads, but not less than 12mm. Standard color to be clear.
   e) Laminated Tempered Glass
      (1) ASTM C 1172, Condition A (uncoated), Type 1 (transparent flat glass), Quality Q-3 with two plies of glass and polyvinyl butyral interlayer not less than 0.060 inch (1.52 mm) thick. Standard glass to be clear with one layer of polyvinyl butyral interlayer to comply with manufacturers written recommendations.

2.2 FINISHES

A) Aluminum
   a) AA 204 or AA 215 R1 Clear satin anodize.
   b) 180 grit centerless ground.
   c) Kynar 500 High-performance organic coating.
   d) Powder coating with pre-treatment and average 3 mil film thickness per AAMA 2604 in standard color and gloss.

B) Stainless Steel
   a) #4 (180 grit) centerless ground.
   b) #4 (180 grit) directional.
   c) #6 (320 grit) centerless ground.
   d) #6 (320 grit) directional.
   e) #7 mirror polish with visible grain

f) #8 mirror polish.

B) Copper Alloys
   a) #4 (180 grit) centerless ground.
   b) #4 (180 grit) directional.
   c) #6 (320 grit) centerless ground.
   d) #6 (320 grit) directional.
   e) #7 mirror polish with visible grain
   f) #8 mirror polish
   g) Oil rubbed finishes available on request

2.3 FABRICATION

A) Fabricate handrails and guardrails in accordance to approved shop drawing and field dimensions using mitered and welded joints with bends where indicated on shop drawings.
B) Shop fabricate in greatest possible lengths to eliminate field splicing, but not to exceed 20'-0" in length.
C) Form bends to uniform radius, free of distortion, twists, cracks and grain separation.
D) Top rails shall be continuous over posts for strength with splices for expansion located within 6 to 12 inches of post.
E) Splices and expansion joints shall utilize internal splice connectors with set screws to allow for rail expansion over ambient temperature change.
F) Weld all shop assembled connections continuous without undercut and or distortion of rail materials.
G) Grind and or dress exposed welds smooth and flush to corner or fillet without weakening rail connection.
H) Remove all burrs and sharp edges from exposed ends of final rail assemblies.
I) Lightly sand and blend with fine grit paper all light scratches prior to rail finishing.
J) Provide drainage and weep holes within rail assemblies to prevent entrapment of water within rail assemblies. Note that caution should be used when pressure washing rails assemblies to prevent water entry to non- vented areas under pressure.
K) Provide post inserts where required due to loading within long post spans.

2.4 GLAZING PANEL FABRICATION

A) General: Fabricate to sizes and shapes required; provide for proper edge clearance and bite on glazing panels.
   a) Grind smooth exposed edges, including those at exposed joints to produce square edges with slight chamfers at junctions of edges and faces.
   b) Provide tempered or laminated tempered glass panels as indicated on shop drawings.

PART 3- EXECUTION

3.1 EXAMINATION

A) Verify that field conditions are acceptable and ready to receive work.

3.2 INSTALLATION

A) Install in accordance with shop drawings utilizing established working points.

B) Set railings within sleeves, use anchor bolts or core drill for mounting holes. Maintain slab edge distances and rail locations per shop drawings.
C) Assemble rails fitting splices together to form tight hairline joints while allowing for thermal expansion as required.
D) Make all adjustments to alignment for satisfactory rail appearance and to plumb posts prior to final tightening of fasteners or pouring of holes.
E) Set railings within sleeves or cored holes using a high quality anchoring grout such as Quickrete. Slope grout 1/8” up on posts for drainage.
F) Locate wall brackets per shop drawings and set anchors within concrete or into blocking within sheetrock walls. Use wall rails to insure proper location and plumb at ends.
G) Install wall rail onto brackets using fasteners supplied per the drawings.
H) After installation is complete clean product using non-abrasive mild soap and water. Do not utilize any cleaners containing any type of acid.
I) Use touch up paint and touch up kit to repair any areas damaged during installation.

END OF SECTION