



SECTION 05 52 00
ALUMINUM HANDRAILS AND GUARDRAILS

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum handrails and guardrails.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 03 62 13 - Non-Shrink Grouting.
- C. Section 03 63 00 - Epoxy Grouting.
- D. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.
- E. Section 08 43 26 - All-Glass Storefronts.
- F. Section 08 43 33 - Folding Glass Wall System.
- G. Section 08 35 13.13 - Accordion Folding Doors.
- H. Section 08 81 00 - Glass Glazing.
- I. Section 08 44 13 - Glazed Aluminum Curtain Walls.

1.3 REFERENCES

- A. ADAAG - Americans with Disabilities Act Accessibility Guidelines.
- B. ANSI/ASME B 18.6.4 - Mechanical and Quality Requirements for Tapping Screws.
- C. ASTM International (ASTM):
 1. ASTM A 53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 2. ASTM A 269 - Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 3. ASTM A 276 - Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
 4. ASTM A 312 - Specification for Seamless and Welded Austenitic Stainless Steel Pipe.
 5. ASTM B 26 - Standard Specification for Aluminum-Alloy Sand Castings.
 6. ASTM B 29 - Standard Specification for Refined Lead.
 7. ASTM B 179 - Standard Specification for Aluminum Alloys in Ingot and Molten Forms for Castings from All Casting Processes.
 8. ASTM B 26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2005.
 9. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2004.

10. ASTM B 210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2004.
 11. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2005.
 12. ASTM B 247 - Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings; 2000.
 13. ASTM B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2002.
 14. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 1997.
 15. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink); 2002.
 16. ASTM E 488 - Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements; 1996.
- D. "Mechanical Properties" in AAMA Aluminum Curtain Wall Series No. 12, "Structural Properties of Glass".
- E. International Code Council (ICC):
1. International Building Code (IBC).
 2. International Residential Code (IRC).
- F. U.S. Green Building Council:
1. The Leadership in Energy and Environmental Design (LEED) Green Building Rating System.

1.4 SYSTEM DESCRIPTION

- A. Refer to definitions in ASTM E985 and ISO/TC 59 for railing-related terms that apply to this Section.
- B. Railing shall conform to pertinent sections of the following codes:
1. OSHA.
 2. Applicable state and local building codes.
 3. ADAAG - Americans with Disabilities Act Accessibility Guidelines.
- C. Handrail for Ramps and Stairs:
1. Ramps with a rise greater than 6 inches (152 mm) shall have handrails on both sides.
 2. Handrail will be installed at a height of 34 to 38 inches (864 to 965 mm) above ramp surface.
 3. A curb, rail, wall, or barrier shall be provided to serve as edge protection. Curb shall be minimum 4 inches (102 mm) in height. A barrier shall be constructed so as to prevent the passage of a 4 inches (102 mm) diameter sphere above ramp grade level.
 4. On circular cross sections, the gripping surface shall have a diameter of between 1-1/2 inches (38 mm) and 2 inches (51 mm).
 5. A clearance of a minimum 1-1/2 inches (38 mm) shall exist between the wall or post surface and the handrail.
 6. At the top and bottoms of handrail sections that stop at a landing, the handrail shall extend 12 inches (305 mm) horizontally beyond the top riser and 12 inches (305 mm) horizontally beyond the bottom tread.
 7. Ramps with a drop off of 30 inches (762 mm) or more to grade shall require guards.
 8. Handrail shall be continuous, without interruption by newel posts or other obstructions.
 9. Handrails shall return to a wall, guard or walking surface.
- D. Structural Performance: Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors, and connections:

1. Components and installation shall be in accordance with state and local code authorities.
 2. Components and installation shall follow current ADA and ICC/ANSI A117.1 guidelines.
 3. Top Rail: Shall withstand the following loads.
 - a. Concentrated load of 200 lbf (0.89 kN) applied at any point and in any direction.
 - b. Uniform load of 50 lbf-ft. (0.07 kN-m) applied horizontally and concurrently with uniform load of 100 lbf-ft. (0.14 kN-m) applied vertically downward.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
 4. Handrails Not Serving As Top Rails: Shall withstanding the following loads.
 - a. Concentrated load of 200 lbf (0.89 kN) applied at any point and in any direction.
 - b. Uniform load of 50 lbf-ft. (0.07 kN-m) applied in any direction.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
 5. Guard Infill Area: Shall withstand the following loads.
 - a. Concentrated horizontal load of 200 lbf (0.89 kN) applied to 1 square foot (0.09 m²) at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area. Loads need not be assumed to act concurrently with loads on top rails in determining stress on guard.
 6. Glass: Fully tempered glass in glass-supported handrails and railings requires a design with a safety factor of 3 applied to the applicable modulus of rupture listed in "Mechanical Properties" in AAMA Aluminum Curtain Wall Series No. 12, "Structural Properties of Glass".
- E. Thermal Movement: Provide exterior railings that allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 degree F (49 degree C), ambient; 180 degree F (82 degree C), material surfaces.
- F. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Product Data: Submit manufacturer's data sheets on each product to be used, including, but not limited to, the following:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
 4. Grout, anchoring cements and paint products.
- C. Shop Drawings: Submit shop drawings showing fabrication and installation of handrails and railings. Include plans, elevations, sections, details, and attachments to other work.
 1. Provide setting diagrams for installation of anchors, location of pockets, weld plates for attachment of rails to structure, and blocking for attachment of wall rail.
 2. Indicate all required field measurements to be held.
 3. Indicate materials, sizes, styles, fabrication, anchorage and installation details for railing system and infill.
 4. Signed and Sealed Shop Drawings to be provided by Registered Professional Engineer:

- D. Certifications
 1. Furnish certification that all components and fittings are furnished by the same manufacturer or approved by the primary component manufacturer.
 2. Furnish certification that components were installed in accordance to the manufacturer's engineering data to meet the specified design loads.

- E. Samples:
 1. Post and rail sections- minimum 4 inch (100 mm) long piece of each type.
 2. Color Selection: Submit manufacturer's color charts showing the full range of colors available for products with factory-applied color finishes.
 3. Verification Samples: For each type of exposed finish required, prepared on components indicated below and of same thickness and metal indicated for the work. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
 - a. 6 inches (152 mm) long sections of each different linear railing member, including handrails and top rails.

- F. Quality Control Submittals:
 1. Certificates: Submit certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's).

- G. LEED Submittals: Submittals that are required to comply with requirements for LEED certification include, but shall not be limited to, the following:
 1. Recycled Content: Provide product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
 2. Regional Materials: Provide product data for regional materials indicating location and distance from the Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Distance shall be within 500 miles (805 Km) of the Project Site.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall be a firm engaged in the manufacture of aluminum handrails and railings of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of 5 years.

- B. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

- C. Installer Qualifications: Minimum 2 year experience installing similar products.

- D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 1. Install one complete railing including infill panel at location selected by Architect.
 2. Obtain Architect's approval prior to installing additional railings.
 3. Refinish mock-up area as required to produce acceptable work.
 4. Approved sample may remain as part of completed work.

1.7 PRE-INSTALLATION MEETINGS

- A. Pre-Installation Meeting:
 1. Prior to the beginning of work, conduct a pre-job conference at the job site.
 2. Provide seven calendar days advance written notice ensuring the attendance by competent authorized representatives of the fabricator, building owner's representative, architect and subcontractors whose work interfaces with the work of

this section.

3. Review the specifications to determine any potential problems, changes, scheduling, unique job site conditions, installation requirements and procedures and any other information pertinent to the installation.
4. Record the results of the conference and furnish copies to all participants.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Handling: Handle materials to avoid damage.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.10 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.11 WARRANTY

- A. At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.
 1. Surface Finish Warranty.
 2. Material Integrity Warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: PRL Glass Systems, Inc., which is located at: 13644 Nelson Ave.; City of Industry, CA 91746; Toll Free Tel: 800-433-7044; Fax: 626-968-9256; Email: [requestinfo \(info@prlglass.com\)](mailto:requestinfo@prlglass.com); Web: <https://prlglass.com>
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 WET SET GLAZED HANDRAIL SYSTEM - TOP MOUNT

- A. Glass handrail systems consisting of 1/2 inch clear tempered glass mounted into a 2-1/2 inches x 4-1/2 inches (64 mm x 114 mm) aluminum base shoe and capped with a 2 inches (51 mm) round extruded aluminum rail and glazed with Rockite cement and anchored with 1/2 inch (13 mm) bolts on 12 inches (305 mm) centers and confirmed by test results.
 1. The performance of this design meets model design and code requirements with the following safety factors: 2.6 for uniform and concentrated loads per ASTM E 935-00.

2.3 DRY SET GLAZED HANDRAIL SYSTEM - TOP MOUNT

- A. Glass handrail systems consisting of 1/2 inch clear tempered glass mounted into a 2-1/2 inches x 4-1/2 inches (64 mm x 114 mm) aluminum base shoe and capped with a 2 inches

(51 mm) round extruded aluminum rail and glazed with Rockite cement and anchored with 1/2 inch (13 mm) bolts on 12 inches (305 mm) centers and confirmed by test results.

1. The performance of this design meets model design and code requirements with the following safety factors: 3.87 for uniform and concentrated loads per ASTM E 935-00.

B. Glass guardrail system with "Mini-Rapid" 2-3/4 inches (70 mm) high aluminum base shoe.

1. A safety factor of 4.0 was applied to in-fill test loads to account for Section 2407 of IBC 2009, Glass in Handrails and Guards.
2. The performance of this design meets model design and code requirements with the following safety factors: 75% deflection recovery from 2.0 times design load and withstanding an ultimate load of 2.5 times design load (4.0 design load for in-fill load tests), per Chapter 17 of the IBC 2009.

2.4 DRY SET GLAZED HANDRAIL SYSTEM - SIDE MOUNT

A. Glass handrail systems consisting of 1/2 inch clear tempered glass mounted into a 2-1/2 inches x 4-1/2 inches (64 mm x 114 mm) aluminum base shoe and capped with a 2 inches (51 mm) round extruded aluminum rail and glazed with Rockite cement and anchored with 1/2 inch (13 mm) bolts on 12 inches (305 mm) centers and confirmed by test results.

1. The performance of this design meets model design and code requirements with the following safety factors: 4.25 for uniform and concentrated loads per ASTM E 935-00.

B. Glass guardrail system with "Mini-Rapid" 2-3/4 inches (70 mm) high aluminum base shoe.

1. A safety factor of 4.0 was applied to in-fill test loads to account for Section 2407 of IBC 2009, Glass in Handrails and Guards.
2. The performance of this design meets model design and code requirements with the following safety factors: 75% deflection recovery from 2.0 times design load and withstanding an ultimate load of 2.5 times design load (4.0 design load for in-fill load tests), per Chapter 17 of the IBC 2009.

2.5 SYSTEMS

A. Elegant Railing System as manufactured by PRL Glass Systems, Inc.

B. Infinity Series as manufactured by PRL Glass Systems, Inc.

1. Model: 200 Series.
2. Model: 2250 Series.
3. Model: 2300 Series.
4. Model: 2350 series.
5. Color: White.
6. Color: Black.
7. Color: Bronze.
8. Color: Silver.

2.6 FINISH

A. Naval Brass Finish: Brushed.

B. Naval Brass Finish: Polished.

C. Stainless Steel Finish: Brushed.

D. Stainless Steel Finish: Polished.

E. Aluminum Finish: White powder coat.

F. Aluminum Finish: Bronze anodized.

- G. Aluminum Finish: Mill finish.
- H. Aluminum Finish: Clear anodized.

2.7 COMPONENTS

A. Glass:

- 1. Starphire. Refer to Section 08 81 00 - Glass Glazing.
- 2. Clear. Refer to Section 08 81 00 - Glass Glazing.
- 3. Custom. Refer to Section 08 81 00 - Glass Glazing.
- 4. Texture. Refer to Section 08 81 00 - Glass Glazing.
- 5. Cast. Refer to Section 08 81 00 - Glass Glazing.
- 6. Laminated. Refer to Section 08 81 00 - Glass Glazing.

B. Handrail Base Shoes:

- 1. Wet Glaze Handrail Base Shoe:
 - a. Part Number: - HRBBS.
 - b. Finish: - #4 Brushed S.S.
 - c. Material: - 6063-T5.
 - d. Glass Thickness: - 1/2 inch (13 mm) & up.
 - e. Detail: - Bottom or optional fascia mount.
 - f. 2-1/2 inches x 4-1/8 inches (64 mm x 105 mm) standard size base shoe. 10, 12 and 20 Feet (3048 mm, 3658 mm, 6096 mm) stock size.
 - g. Custom size available upon request.
 - h. All other accessories available. Rockite cement required
 - i. Test Report: - Cclw Job # 08-5221.
- 2. Dry-Set Handrail Base Shoe:
 - a. Part Number: - PLDSHRBBS.
 - b. Finish: - #4 Brushed S.S.
 - c. Material: - 6063-T5.
 - d. Glass Thickness: - 1/2 inch (13 mm) & up.
 - e. Bottom or optional fascia mount.
 - f. Available stock sizes are 10, 12 and 20 Feet (3048 mm, 3658 mm, 6096 mm).
 - g. Custom size available upon request
 - h. Plumb adjustment up to 5/8 inch (16 mm) (vertically) & 5/8 inch (16 mm) (right side).
 - i. Test Report Cclw Job # 10-5395-1.

C. Top Cap:

- 1. 2 inches (51 mm) Diameter Cap:
 - a. Part Number: - 2TCBS.
 - b. Finish: - #4 Brushed S.S.
 - c. Material: - 304 stainless standard (316 available upon request).
 - d. Glass Thickness: - 1/2 inch (13 mm).
- 2. 3 inches (76 mm) Diameter Cap:
 - a. Part Number: - 3TCBS.
 - b. Finish: - #4 Brushed S.S.
 - c. Material: - 304 stainless standard (316 available upon request).
 - d. Glass Thickness: - 1/2 inch (13 mm).

D. Accessories:

- 1. Handrail 135 Degree Elbow:
 - a. Part Number: - HR135E.
 - b. Finish: - #4 Brushed S.S.
 - c. Material: - 316 Stainless Steel.
- 2. Handrail Top Cap Endcaps:
 - a. Part Number: - HREC.

- b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
- 3. 1-1/2 inches (38 mm) Diameter Tubing:
 - a. Part Number: - HR15.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Detail: - For handrail systems.
- 4. Floor Flange 1-1/2 inches (38 mm) Tubing:
 - a. Part Number: - HR15FF.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - N/A.
 - e. Detail: - Used for handrail post systems.
- 5. 90 Deg. 1-1/2 inches (38 mm) Radius Wall Return:
 - a. Part Number: - HR15RE.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Detail: - Wall return for used in railing systems.
- 6. Handrail 90 Degree Elbow:
 - a. Part Number: - HR90E.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Detail: - 90 degree elbow for used in top cap systems.
- 7. Hand Rail Base Shoe Break Metal:
 - a. Part Number: - HRBREAKBS.
 - b. Finish: - #4 Brushed S.S.
 - c. Material: - Please contact PRL for information.
 - d. Detail: - Break metal for hand rail base shoe.
 - e. Can be cut to custom length or size.
- 8. Handrail Bottom Setting Block:
 - a. Part Number: - HRBSB.
 - b. Finish: - N/A.
 - c. Material: - PVC.
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - Setting block to center glass in base shoe.
- 9. 42X2 Diameter SS Post W/ Sill Flange:
 - a. Part Number: - HRPOST.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
- 10. Handrail Splice Sleeves:
 - a. Part Number: - HRSS.
 - b. Finish: - N/A.
 - c. Material: - T5-6063 Aluminum or Stainless Steel.
 - d. Detail: - Used to join top cap when splice is required.
- 11. Handrail Top Vinyl Insert:
 - a. Part Number: - HRTVI.
 - b. Finish: - N/A.
 - c. Material: - PVC.
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - Top cap vinyl insert secures glass in place.
- 12. Handrail Wall Mount Bracket:
 - a. Part Number: - HRWMB.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - For 1-1/2 inches (38 mm) to 2 inches (51 mm) diameter hand rail tube.

13. Z-Clip For H/R Post;
 - a. Part Number: - HRZCLIP.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - 1/2 inch (13 mm).
14. Dry-Set Handrail Base Shoe Vinyl:
 - a. Part Number: - PLDSHRB844VR1.
 - b. Finish: - N/A
 - c. Material: - PVC.
15. Dry-Set Handrail Base Shoe-Drop In Covers:
 - a. Part Number: - PLDSHRBDIC.
 - b. Finish: - Mill Finish.
 - c. Material: - 6063-T5.
 - d. Detail: - Drop in covers for easy installation.
 - e. Can be clad in different finishes.
16. Dry-Set Handrail Mounting Pressure Plate:
 - a. Part Number: - PLDSHRPG.
 - b. Finish: - N/A.
 - c. Material: - PVC
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - Mounting pressure plate to secure the glass in place.
17. Hand Rail Glass Mount Bracket:
 - a. Part Number: - PLHR20XAGPS.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - 2 way adjustable.
 - f. For 1-1/2 inches (38 mm) to 2 inches (51 mm) diameter hand rail tube.
 - g. Custom wall projection available upon request.
18. Handrail Wallmount Bracket:
 - a. Part Number: - PLHR20XAWPS.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - 2 way adjustable.
 - f. For 1-1/2 inches (38 mm) to 2 inches (51 mm) diameter hand rail tube.
 - g. Custom wall projection available upon request.
19. Hand Rail Glass Mount Bracket:
 - a. Part Number: - PLHR20XBGPS
 - b. Finish: - #8 Polished S.S
 - c. Material: - 316 Stainless Steel
 - d. Glass Thickness: - 1/2"
 - e. Detail: - 2 way adjustable.
 - f. For 1-1/2 inches (38 mm) to 2 inches (51 mm) diameter hand rail tube.
20. Handrail Wallmount Bracket:
 - a. Part Number: - PLHR20XBWPS.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - 2 way adjustable.
 - f. For 1-1/2 inches (38 mm) to 2 inches (51 mm) diameter hand rail tube.
21. Hand Rail Glass Mount Bracket:
 - a. Part Number: - PLHR20XCGPS.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - 1/2 inch (13 mm).

- e. Detail: - 3 way adjustable.
 - f. For 1-1/2 inches (38 mm) to 2 inches (51 mm) diameter hand rail tube.
22. Handrail Wallmount Bracket:
- a. Part Number: - PLHR20XCWPS.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - 2 way adjustable.
 - f. For 1-1/2 inches (38 mm) to 2 inches (51 mm) diameter hand rail tube.
23. Hand Rail Glass Mount Bracket:
- a. Part Number: - PLHR20XDGPS.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - 2 way adjustable.
 - f. For 1-1/2 inches (38 mm) to 2 inches (51 mm) diameter hand rail tube.
24. Handrail Wallmount Bracket:
- a. Part Number: - PLHR20XDWPS.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - 2 way adjustable.
 - f. For 1-1/2 inches (38 mm) to 2 inches (51 mm) diameter hand rail tube.
25. Hand Rail Glass Mount Bracket:
- a. Part Number: - PLHR20XEGPS
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - 2 way adjustable.
 - f. For 1-1/2 inches (38 mm) to 2 inches (51 mm) diameter hand rail tube.
26. Handrail Wallmount Bracket:
- a. Part Number: - PLHR20XEWPS.
 - b. Finish: - #8 Polished S.S.
 - c. Material: - 316 Stainless Steel.
 - d. Glass Thickness: - 1/2 inch (13 mm).
 - e. Detail: - 2 Way Adjustable.
 - f. For 1-1/2 inches (38 mm) to 2 inches (51 mm) diameter hand rail tube.
27. Stand Off Base and Endcap, with Mounting Plate:
- a. Part Number: - PLRSOBD20BS.
 - b. Finish: - #4 Brushed S.S.
 - c. Material: - 316 Stainless.
 - d. Glass Thickness: - 3/8 inch to 3/4 inch (9.5 mm to 19 mm).
 - e. Detail: - 2 inches (51 mm) diameter stand off base & endcap with mounting plate.
 - f. Custom size available upon request.
28. 2 inches (51 mm) Diameter Stand Off:
- a. Part Number: - PLRSOBD2134BS.
 - b. Finish: - #4 Brushed S.S.
 - c. Material: - 316 Stainless.
 - d. Glass Thickness: - 3/8 inch to 3/4 inch (9.5 mm to 19 mm).
 - e. Detail: - 2 inch (51 mm) diameter stand off base & endcap.
 - f. Custom size available upon request.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Wet Set Handrail:
 - 1. Set setting blocks.
 - 2. Insert glass.
 - 3. Level glass.
 - 4. Rockite cement.
 - 5. Insert top cap vinyl.
 - 6. Insert top cap.
- C. Dry Set Handrail:
 - 1. Set mounting pressure plate.
 - 2. Insert mounting pressure plate.
 - 3. Insert glass.
 - 4. Tighten bolts.
 - 5. Drop in cover plates.
 - 6. Insert base shoe.
 - 7. Insert top cap vinyl.
 - 8. Set top cap.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION