

RAILING DESIGN

General Information

1. This catalog provides general guardrail configurations and components to the requirements of the latest Ontario Building Code (1997).
2. The ability of supporting floor and wall structures to resist the effects of the loads of these components either singly or in combination with other loads and effects remain the sole responsibility of the project architect/engineer.
3. The complete design and preparation of shop drawings for the aluminum railing system and all related items are designed for each individual project. Posts and anchorage vary in size and quantity for each type of guardrail and shall be the manufacturer's responsibility that the design requirements are met. (see standards on next page).
4. The manufacture and installation of guardrails and their components shall be in strict accordance with shop drawings and specifications prepared by Greco Aluminum Railings.
5. Greco's shop drawings are sealed by a qualified Professional Engineer who specializes in our welded aluminum railing system. Shop drawings prepared for projects in other jurisdictions will comply with their respective building code.

Canadian Standards

- Latest Ontario Building Code (1997) or code of other provinces as applicable.
- National Building Code
- CSA Standard CAN3-S157-M83 "Strength Design in Aluminum"
- CSA Standard S190-1969 "Design of Light Gauge Aluminum Products"
- CSA Standard S244-1969 "Welded Aluminum Design And Workmanship"
- CAN/CSA-086.1 S066.1 - M89 "Engineering Design in Wood"
- CSA Standard CAN3-A23.3 "Design of Concrete Structures for Buildings"
- CSA Standard CAN3-S304 "Masonry Design for Buildings"
- CSA HA Series - M1980 "Steel Structures for Building - Limit States Design"
- CSA Standard W47.2 - M1987 "Certification of Companies for Fusion Welding Of Aluminum"
- CSA Standard - W59 - M1989 "Welded Steel Construction"
- CSA Standard - W59.2 - M1991 "Welded Aluminum Construction"
- CSA - CAN3 - 516.1 - M78 "Steel Structures for Buildings - Limit States Design"
- ASTM E985 "Standard Specification for Permanent Metal Railing Systems and Rails for Buildings"
- CAN3-S157-M & ASTM E935 "Standard Test Methods for Performance of Metal Railing Systems for Buildings"

Greco manufactures aluminum railing systems to the highest industry standards and to the applicable building code. For further information, contact Greco Aluminum Railings.

Material Specifications / Fabrication

Materials:

1. All aluminum custom extrusions and GAR-P1 shape are alloy 6005-T6 or 6061-T6.
2. Aluminum sheets are alloy 5052H32 series.
3. All other aluminum structural shapes are alloy 6351-T6.
4. All 6 mm tempered glass conforms to CAN/CGSB12.1-M90.
5. All screws for fastening aluminum members shall be corrosive resistant self-tapping screws.
6. All bolts and lag screws are grade 304 stainless steel and conform to ASTM A307.
7. Anchor Bolts: For concrete balcony slab and walls - expansion anchoring system are to be used. For masonry connection - sleeve expansion anchors are to be used.

Fabrication:

1. Fabrication practices follow those for steel as in CSA -CAN3-S16.1-M except as otherwise modified by CSA-CAN3-S157-M83.
2. All welding is done with gas metal arc welding (MIG).
3. Welding operators and procedures used are qualified to CSA Standard W47.2.
4. Robotic welding and procedures are qualified to CSA Standard W47.2.
5. All base plates shall have a minimum 10 mm diameter drain hole.

DIVISION 05: METALS
SECTION 05720 ALUMINUM RAILING SYSTEM

PART I - GENERAL

1.1 Scope

- .1 Comply with General and Supplementary Conditions and General Requirements.
- .2 Provide materials, labour and equipment for the installation of guardrails as shown on the drawings, described herein, or as necessary to complete the work.
- .3 This specification is based on guardrail and balcony dividers systems manufactured by Greco Aluminum Railings, Windsor, Ontario, 1-800-363-7245, Fax- 519-966-4901.

1.2 Standards

- .1 Aluminum Sections: to CSA HA-Series-M.
- .2 Design to the latest issues of the following:
 - Ontario Building Code
 - National Building Code
 - CSA Standard CAN3-S157-M Strength Design in Aluminum
 - ASTM E985 Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
 - ASTM E894 Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings.
- .3 Welding to CSA Standard W59.2-M-1991.
- .4 Certification of companies for fusion welding of aluminum to CSA Standard W47.2-M1987.
- .5 Testing to CAN3-S157-M and ASTM E935 Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.

1.3 Samples

- .1 Submit a mock-up sample of the railing section for review prior to fabrication.
- .2 Submit paint samples to the Owner and/or Owners representative for selection of colour for all prefinished aluminum components.

1.4 Shop Drawings

- .1 Submit 5 copies of shop drawings prior to commencement of fabrication, clearly showing:
- .2 Shop drawings shall bear the signed stamp of a professional structural engineer registered in Ontario.
- .3 Shop drawings shall show cuts, copes, connections, holes, fasteners, anchors, types, sizes, spacing of posts, welds and all relevant dimensions.

1.5 Protection

- .1 Before shipment, protect railings and finish surfaces against damage, crate, wrap or package for shipment and storage.
- .2 Take all necessary precautions to ensure paint surfaces are not scratched during hoisting and erection.
- .3 Maintain squareness of railings during hoisting and installation.

PART II PRODUCTS

2.1 Materials

- .1 Aluminum: CSA, Type 6005T6 or Type 6351-T6.
- .2 Sheet Aluminum: CSA. Type 5052 H32.

- .3 Fasteners, anchors: Stainless Steel Type 304.
- .4 6 mm tempered glass to conform to CAN /CGSB-12.1-M
- .5 The top handrail shall be a rounded profile. All changes in direction of the top handrail (ie. At corners, returns etc.) shall be equipped with a prefabricated sleeve to splice the sections of the top handrail together. Mitering of adjacent sections of the handrail will not be accepted.
- .6 All components of the guardrails and balcony divider shall be fabricated of similar metal. All associated hard ware including shims, anchor bolts, screws, washers, nuts etc. shall be corrosion resistant material.

2.2 Fabrication

- .1 Fabricate railings square, plumb, staight and true with all joints neatly and accurately aligned and fastened and protected with sleeves.
- .2 Remove burrs from cut sections.
- .3 Make punched or drilled holes in components clean and accurately spaced without deformation to components.
- .4 Fabrication practices shall follow those for steel, as in CSA-CAN3-S16.1-M except as otherwise modified by CSA-CAN3-S157-M83

2.3 Finishes

- .1 Finish all aluminum components by polyester electrostatic powder coating
- .2 Pretreat all metal components as recommended by coating manufacturer and apply coating in strict accordance with manufactureris printed directions.
- .3 Ensure appearance is visibly free from flow lines, streaks, sags, and blisters.

PART III EXECUTION

3.1 Installation

- .1 Give at least three (3) days notice to the owner before starting work onsite.
- .2 Conform to all the latest Ministry of labour, Occupational Health and Safety Act requirements during installation of the work.
- .3 Take site measurements to ensure that railings are fabricated to fit surrounding construction, around obstructions and projections in place, as shown on the drawings, and to suit service locations.
- .4 Install railings plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding construction.
- .5 Provide stainless steel anchor bolts, washers, nuts, sleeves, brackets, clips and other items necessary for secure installation of the railings.

3.2 Cleaning

- .1 Repair areas of bare metal, welds and shop applied finishes in field only with the approval of the Consultant.
- .2 Clean off dirt on surfaces resulting from installation.
- .3 Touch up coating where damaged during transport or installation. Use material approved by the manufacturer.