



SECTION 05 73 00

ORNAMENTAL HANDRAILS AND RAILINGS

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PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Horizontal Stainless Steel Cable Railing System
 - 2. Vertical Stainless Steel Cable Railing System
- B. Related Sections:
 - 1. Section 4 - Masonry Anchoring and Reinforcing
 - 2. Section 5 - Metal Stairs
 - 3. Section 5 - Metal Railings
 - 4. Section 5 – Stainless Steel Wire Rope Assemblies
 - 5. Section 5 – Decorative Metal Railings
 - 6. Section 6 – Wood Stairs and Railings
 - 7. Section 32 – Planting Accessories

1.02 REFERENCES

- A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
- B. American Society for Testing and Material (ASTM International)
 - 1. ASTM A380 - Practice for Cleaning and Descaling Stainless Steel Parts, Equipment and Systems.
 - 2. ASTM A492 - Specification for Stainless Steel Rope Wire.
 - 3. ASTM A554 – Welded Stainless Steel Mechanical Tubing.

4. ASTM A554 – Specification for Welded Stainless Steel Mechanical Tubing
 5. ASTM A555 - Stainless Steel Wire.
 6. ASTM E985 – Standard Specification for Permanent Metal Railing Systems and Stairs for Buildings
 7. ASTM F1145 - Specification for Turnbuckles, Swaged, Welded, Forged.
- C. Military Specification (MIL)
1. MIL-C-5688 - Pre-Stretching and Proof-Testing of Wire Rope Assemblies.
 2. MIL-W-83420 - Wire Rope, Flexible for Aircraft Control.
 3. MIL-W-87161 – Wire Stranded, Non Flexible for Aircraft Control. Oil Free Condition.

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide I-SYS Stainless Steel Cable Railing System and mounting hardware which have been manufactured and installed to meet or exceed manufacturer's and project performance criteria.

1.04 SUBMITTALS

- A. Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit Manufacturer's product data sheet for specified products.
- C. Shop Drawings: Show layout, sizes, dimensions, details, and installation of railing frame components. Include Details of rope attachment, tensioning methods, hardware, and tensioning and mounting methodology.
- D. Samples: Submit samples of rope and/or hardware, as required by specifier.
- E. Quality Assurance/Control Submittals:
1. Test reports: Submit any test report demonstrating compliance with intended use and code requirements.
 2. Certificates: Submit manufacturer's certificate that product meets or exceeds specified requirements
- F. Closeout Submittals: Submit the Following:
1. Warranty: Submit manufacturer's standard warranty documents
 2. Maintenance Data: Include manufacturer's standard cleaning and maintenance instructions to avoid detrimental actions to finishes and performance.

1.05 QUALITY ASSURANCE

- A. Qualifications:
1. Installer Qualifications: Installer should be experienced in performing work of this section and should have specialized in installation of work similar to that required for this project.

- B. Regulatory Requirements and Approvals:
 - 1. [Code Agency Name]
 - a) [Report or Approval Description]
- C. Mock-Ups: Mock-Ups: Install at project site or appropriate location a job mock-up using acceptable products and manufacturer approved installation methods. Obtain Owner's and Architect's approval of product, application, and workmanship standards. Comply with Division 1 Quality Control (Mock-Up Requirements) Section.
 - 1. Mock-Up Size: [Specify mock-up size and fixation requirements].
 - 2. Maintenance and Disposal: Maintain mock-up during construction for workmanship comparison.
 - a) Removal: Remove and legally dispose of mock-up when no longer required.
 - b) Incorporation: Mock-up may be incorporated into final construction upon Owner's approval.
- D. Pre-Installation Meetings: Conduct with [Contractor, Architect, Fabricator, Installer and any other subcontractors] whose work involves cable railing system to verify project requirements, framing and support conditions, mounting surfaces, manufacturer's installation instructions, and warranty requirements. Comply with Division 1 requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with Division 1 Product Requirements Sections Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. Delivery: Deliver in manufacturer's original, unopened, undamaged containers, identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Store cartons and panels in a secure location in a dry place at the project site.

1.07 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.

PART 2 PRODUCTS

2.01 I-SYS® INOX STAINLESS STEEL CABLE HANDRAIL SYSTEM

- A. Manufactured and sold by: Carl Stahl-DécorCable Innovations LLC, 660 W. Randolph Street, Chicago, IL USA 60661. Tel: 800-444-6271, Fax: 312-474-1789, E: sales@decorable.com, Web: www.decorable.com.
- B. Proprietary Products/Systems: I-SYS® INOX “IK Preassembled” Stainless Steel Cable Handrail System.

1. Material:

- a) Cables: ASTM A492 Type 316 stainless steel 7x7.

IK Rope Assemblies with Swaged or Field Installed End Fittings:.

- a) Stock #IK-100-Swaged RH/RH External Thread both ends
- 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 hex nuts.
 - 4) Notes: Use for simple bolt through installations.
- b) Stock #IK-101-Swaged RH/LH External Thread both ends
- 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 hex nuts.
 - 4) Notes: RH/LH external thread combination speeds tensioning.
- c) Stock #IK-110-Swaged External Threads and Turnbuckles both ends
- 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 barrel turnbuckles, nuts.
 - 4) Notes: Standard two-turnbuckle setup for long cable runs for extra tensioning.
- d) Stock #IK-120-Hammer Swaged F30 RH/RH Low Profile External Thread
- 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 hex nuts.
 - 4) Notes: External thread fitting is only 1-2mm greater in diameter for tight hole dimensions.
- e) Stock #IK-121-Hammer Swaged F30 RH/LH Low Profile External Thread
- 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 hex nuts.
 - 4) Notes: External thread fitting is only 1-2mm greater in diameter for tight hole dimensions.
- f) Stock #IK-125-Hammer Swaged F50 RH/RH Super Low Profile External Thread
- 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 hex nuts.
 - 4) Notes: External thread fitting is same \varnothing as rope for tight hole dimensions.
- g) Stock #IK-126-Hammer Swaged F50 RH/LH Super Low Profile External Thread
- 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 hex nuts.
 - 4) Notes: External thread fitting is same \varnothing as rope for tight hole dimensions
- h) Stock #IK-130-Hammer Swaged F30 External Threads and Turnbuckles both ends
- 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.

- 2) Choose Rope Diameter: 4mm, 5mm, 6mm.
 - 3) Fittings and Hardware: Includes AISI 316 cylinder turnbuckles, nuts.
 - 4) Notes: Low Profile two-turnbuckle setup for long cable runs through tight hole dimensions.
- i) Stock #IK-140-Field Installed RH/RH External Thread both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 hex nuts.
 - 4) Notes: Field installed ends warranted to 90% of rope MBL.
 - j) Stock #IK-141-Field Installed RH/LH External Thread both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 hex nuts.
 - 4) Notes: Field installed ends warranted to 90% of rope MBL.
 - k) Stock #IK-150-Swaged RH External Thread w/swaged radius head end stop
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 hex nuts.
 - 4) Notes: Radius end is nice finish detail on flat posts.
 - l) Stock #IK-160-Swaged RH External Thread w/swaged countersunk head end stop
 - 5) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 6) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 7) Fittings and Hardware: Includes AISI 316 hex nuts.
 - 8) Notes: CS end stop provides flat finish detail on flat/square posts.
 - m) Stock #IK-170-Hammer Swaged F30 RH w/ Internal Radius End Stops both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 4mm, 5mm, 6mm.
 - 3) Fittings and Hardware: Includes AISI 316 end stops and nuts.
 - 4) Notes: All Internal Thread End Stops are RH only. Tightened with hex key.
 - n) Stock #IK-180-Hammer Swaged F30 RH w/ Internal Countersunk End Stops both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 4mm, 5mm, 6mm.
 - 3) Fittings and Hardware: Includes AISI 316 end stops and nuts.
 - 4) Notes: ALL Internal Thread End Stops are RH only. Tightened with hex key.
 - o) Stock #IK-190-Hammer Swaged F30 RH w/ Internal Ball Head End Stops both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm.
 - 3) Fittings and Hardware: Includes AISI 316 end stops and nuts.
 - 4) Notes: ALL Internal Thread End Stops are RH only. Tightened with hex key.
 - p) Stock #IK-200-Swaged RH/RH Internal Thread both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: None included.
 - 4) Notes: RH Internal threads are easy to install and accommodate many end conditions.
 - q) Stock #IK-201-Swaged RH/LH Internal Thread both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: None included.

- 4) Notes: RH/LH Internal threads for quick tensioning.
- r) Stock #IK-210- Field Installed RH/LH Internal Thread both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: None included.
 - 4) Notes: Field installed ends warranted to 90% of rope MBL
- s) Stock #IK-211- Field Installed RH/LH Internal Thread both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: None included.
 - 4) Notes: Field installed ends warranted to 90% of rope MBL
- t) Stock #IK-300-Swaged RH/LH Internal Thread with Forks both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 #871/872 forks, nuts.
 - 4) Notes: Use Forks for mounting to flange type posts and for inclined stair applications
- u) Stock #IK-305-Swaged RH/LH Internal Thread with CS Forks both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 #945/946 CS forks, nuts.
 - 4) Notes: Use Forks for mounting to flange type posts and for inclined stair applications
- v) Stock #IK-310-Swaged Fork and Swaged Turnbuckles with Fork
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes barrel turnbuckle, #871/872 forks, nuts.
 - 4) Notes: Ideal for Trellis and vertical suspension applications
- w) Stock #IK-320-Swaged External RH/LH Thread with Turnbuckles with Fork both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes barrel turnbuckles, #871/872 forks, and nuts.
 - 4) Notes: Use Forks for mounting to flange type posts and for inclined stair applications.
- x) Stock #IK-330-Field Installed RH/LH Internal Thread with Forks both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 #871/872 forks, nuts.
 - 4) Notes: Use Forks for mounting to flange type posts and for inclined stair applications. Field installed ends warranted to 90% of rope MBL.
- y) Stock #IK-340-Hammer Swaged F30 RH/LH with Internal Thread Fork both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 5) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 6) Fittings and Hardware: Includes AISI 316 #817/818 forks, and nuts.
 - 7) Notes: Use Forks for mounting to flange type posts and for inclined stair applications.
- z) Stock #IK-345-Hammer Swaged F30 RH/LH with Internal Thread CS Forks both ends
 - 5) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 6) Choose Rope Diameter: 4mm, 5mm, 6mm, 8mm.

- 7) Fittings and Hardware: Includes AISI 316 #917/918 CS forks, and nuts.
 - 8) Notes: Use Forks for mounting to flange type posts and for inclined stair applications.
- aa) Stock #IK-400-Swaged RH/LH Internal Thread with Eyes both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 #885/886 eyes, nuts.
 - 4) Notes: Use Eyes in tandem with forks for free-articulation in inclined stair applications.
 - bb) Stock #IK-405-Swaged RH/LH Internal Thread with CS Eyes both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 #985/986 CS eyes, nuts.
 - 4) Notes: Use Eyes in tandem with forks for free-articulation in inclined stair applications.
 - cc) Stock #IK-410-Swaged Eye and Swaged Turnbuckles with Eye
 - 5) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 6) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 7) Fittings and Hardware: Includes barrel turnbuckle #885/886 eye, nuts.
 - 8) Notes: Ideal for Trellis and vertical suspension applications
 - dd) Stock #IK-420-Swaged External RH/LH Thread with Eyes and Turnbuckles both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes barrel turnbuckles, #885/886 eyes, and nuts.
 - 4) Notes: Use Eyes in tandem with forks for free-articulation in inclined stair applications.
 - ee) Stock #IK-430-Field Installed RH/LH Internal Thread with Eyes both ends
 - 1) Rope Construction: AISI 316 stainless steel 7x7 wire rope.
 - 2) Choose Rope Diameter: 3mm, 4mm, 5mm, 6mm, 8mm.
 - 3) Fittings and Hardware: Includes AISI 316 #885/886 eyes, nuts.
 - 4) Notes: Use Eyes in tandem with forks for free-articulation in inclined stair applications. Field installed ends warranted to 90% of rope MBL.

Length

- a) Provide optimum adjustment in both directions by calculating final tendon lengths with allowance for tensioning fittings with 2/3 open and with 1/3 of thread length engaged.
- b) Measure tendon length from center of pin to center of pin, or center of eye to center of eye.

2.02 PRODUCT SUBSTITUTIONS

- B. Substitutions: No substitutions permitted.

2.03 FITTINGS AND ACCESSORIES

- A. Accessories: Provide grommet, bushings, nuts, washers, turnbuckles, fittings and other components as required for system installation

2.04 FABRICATION

- A. Stainless Steel Cables and Fittings shall be dimensioned and fabricated to specified size and labeled according to shop drawings and installer's specifications.
- B. Preassemble items in shop to greatest extent practicable to minimize assembly at project site. Disassemble units only to extent necessary for shipping and handling limitations. Mark units for reassembly.

2.05 FINISHES

- A. Clean and/or descale cables and fittings in accordance with ASTM A380.
- B. Passivate in accord with ASTM B912, to provide the following finish: Exterior and Interior: 330 grain satin finish (equiv. to #4 satin finish).

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify condition of previously installed support members to ensure they are acceptable for product installation in accordance with manufacturer's instructions. Do not begin installation until backup surfaces are in satisfactory condition.

3.03 PREPARATION

- A. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.
- B. Take field measurements after permanent end terminations are in place and prior to preparation of shop drawings and fabrication, to ensure fitting of work.

3.04 INSTALLATION

- A. Install rope assemblies in accordance with manufacturer's instructions and the approved shop drawings.
- B. Provide anchorage devices and fittings to secure to in-place construction; including threaded fittings for concrete inserts, toggle bolts and through-bolts. Install system plumb, level, square, and taut.
- C. Anchor system to mounting surfaces as indicated on the drawings.
- D. Separate dissimilar materials with bushings, grommets or washers to prevent electrolytic corrosion.

- E. Use manufacturer's supplied mounting hardware.
- F. Terminate and tension cable system in accordance with manufacturer's instructions.
- G. Ensure ropes are clean, and without kinks or sags.
- H. After final adjustment provide tamper resistant thread-locker on all threaded fittings.

3.05 CLEANING

- A. Remove temporary coverings and protection of adjacent work areas.
- B. Clean installed products in accordance with manufacturer's instructions before owner's acceptance. Do not use chlorine-based or abrasive cleaners.
- C. Remove from project site and legally dispose of construction debris associated with this work.

3.06 PROTECTION

- A. Protection: Protect installed product from damage during subsequent construction activities.

END OF SECTION