SECTION 05 73 00

STAINLESS STEEL CABLE AND ROD RAILING INFILL

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\*\*\* NOTE TO SPECIFIER \*\* Johnson Architectural Hardware; Horizontal and vertical stainless steel cable and rod balustrade infill systems.
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This section is based on the products made by Johnson Architectural Hardware, which is
located at:
1 Matthews Dr,
PO Box L
East Haddam, CT 06423
Toll Free Tel: (800) 874-7455
Tel: (860) 873-8697
Email: info@csjohnson.com)
Web: [www.csjohnson.com](http://www.csjohnson.com)
Sherman Johnson Co. (Johnson Architectural Hardware) has been designing, developing and manufacturing stainless steel cable hardware in the USA since 1958. A pioneer in the cable railing business, Johnson Architectural Hardware has a tradition of providing unique and innovative products to the design professional. Johnson Architectural Hardware provides the right fittings for your project that perform better and are backed by 50+ years of experience and customer support.
This section includes stainless steel cable and rods for railing infill. Johnson cable railings meet code and do not block your view. Johnson fittings are made from type 316 Stainless Steel in the USA. Low maintenance and aesthetic beauty make Johnson fittings easy to use and live with. Johnson can provide you with the support and service you need with fabricator/dealers across the USA, Canada and Caribbean. Johnson wants you to get it right the first time, please let us assist you.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Horizontal cable railing infill system.
		2. Vertical cable railing infill system.
		3. Vertical stainless steel rods.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 30 00 - Cast-in-Place Concrete.
		2. Section 04 40 00 - Stone Assemblies. Requirements for placement of anchors or sleeves in masonry.
		3. Section 05 50 00 - Metal Fabrications.
		4. Section 05 51 00 - Metal Stairs.
		5. Section 05 52 17 - Roof Fall Protection.
		6. Section 06 20 00 - Finish Carpentry.
		7. Section 06 43 13 - Wood Stairs.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American Iron and Steel Institute (AISI) - Steel Product Manual; Stainless and Heat Resisting Steel.
		2. ASTM A 276 - Stainless and Heat-Resisting Steel Bars and Shapes.
		3. ASTM A 380 - Practice for Cleaning and Descaling Stainless Steel Parts, Equipment and Systems.
		4. ASTM A 492 - Specification for Stainless Steel Rope Wire.
		5. ASTM A 555 - Stainless Steel Wire.
		6. ASTM A 582 - Specification for Free-Machining Stainless and Heat-Resisting Steel Bars.
		7. ASTM E 935 - Permanent Metal Railing Systems and Rails for Buildings.
		8. ASTM E 985 - Anchorage of Permanent Metal Railing Systems and Rails for buildings.
		9. ASTM F 1145 - Specification for Turnbuckles, Swaged, Welded, Forged.
		10. MIL-C-5688 - Pre-Stretching and Proof-Testing of Wire Rope Assemblies.
	1. DESIGN / PERFORMANCE REQUIREMENTS

\*\* NOTE TO SPECIFIER \*\* It is the Architect's responsibility to design the stainless steel cable railings including supporting posts, frames, and anchorage method to comply with applicable codes and regulations. Consult load tables contained in the manufacturers product data for required data. The framework for the railing must be strong enough to support the number cable assemblies used and tensioned to 350 lbs. The following paragraphs identify typical code conditions, edit as required to suit actual requirements. Delete if data is indicated on the Drawings.

* + 1. Structural Requirements: Provide cable railings systems capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated on the Drawings:
			1. Handrails:
				1. Uniform load of 50 lbs/ft. (0.73 kN/m) applied in any direction.
				2. Concentrated load of 200 lbs/ft (0.89 kN) applied in any direction.
				3. Uniform and concentrated loads need not be assumed to act concurrently.
			2. Top Rails of Guards:
				1. 50 lbs/ft. (0.73 kN/m) applied horizontally and concurrently with 100 lbs/ft. (1.46 kN/m) applied vertically downward.
				2. Concentrated load of 200 lbs/ft (0.89 kN) applied in any direction.
				3. Uniform and concentrated loads need not be assumed to act concurrently.
			3. Infill of Guards:
				1. Concentrated load of 200 lbs/ft (0.89 kN) applied horizontally on an area of 1 SF (0.093 sm).
			4. Railing shall comply with all requirements of the ADA and OSHA regulations.

\*\* NOTE TO SPECIFIER \*\* It is the Architect's responsibility to design the stainless steel cable railings including the height of railings, size and clearance of handrails, size of openings in guardrails, and other attributes to comply with applicable codes and regulations. Cable railings require specific spacing to meet code. Refer to "Suggested Railing Framework" in Johnson literature for additional information. The following paragraphs identify typical code conditions, edit as required to suit actual requirements. Delete if data is indicated on the Drawings.

* + 1. Cable railing systems shall be designed, fabricated, and installed to comply with applicable codes and regulations.
			1. Minimum guardrail height: 42 inches (1067 mm).
			2. Maximum opening in guardrail: Shall restrict 4 inches (102 mm) diameter sphere.
			3. Handrail diameter: 1-1/4 inches (32 mm) minimum and 2 inches (51 mm) maximum.
			4. Handrail clearance from wall: 1-1/2 inches (38 mm) minimum.
		2. Cable railing systems shall be designed, fabricated, and installed to accommodate expansion and contraction of metal components without causing undue stress, buckling, opening of joints, and distortion.
		3. Design supports and hardware to withstand loads encountered without excessive deflection or distortion when cables are tensioned to required amounts required to conform to applicable building codes.
		4. Exposed fasteners shall be of same materials, color and finish as material to which applied. Exposed surfaces throughout project shall have same inherent texture and color for similar locations.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product Data: Provide manufacturer's standard catalog data for specified products demonstrating compliance with referenced standards. Provide list of fittings being provided with descriptions, load capabilities, and either photographs or drawings for each type.
		3. Shop Drawings: Submit Shop Drawings for fabrication and installation. Include the following:
			1. Plans, elevations, and detail sections.
			2. Indicate materials, methods, finishes, fittings, fasteners, anchorages, and accessory items.
			3. Provide setting diagrams and templates for anchorages, sleeves, and bolts to be installed by others.
			4. Where materials or fabrications are indicated to comply with design loadings, include material and safety factor properties, and other information needed for structural analysis.
		4. Verification Samples: For each finish products specified, two samples, actual product, color, and finish as follows.
			1. Cable with fitting, minimum size 12 inches (300 mm) long.
			2. Typical fittings.
		5. Installation Instructions: Manufacturer's printed installation instructions.
		6. Operation and Maintenance Data: Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
		7. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
		8. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic checking and adjustment of cable tension and periodic cleaning and maintenance of all railing and infill components.
	2. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Company specializing in manufacturer of stainless steel cable assemblies with 5 years minimum experience.
		2. Installer Qualifications: Experienced in performing work of this section that has specialized in installation of work similar to that required for this project.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
			1. Locate in areas designated by Architect.
			2. Size: Minimum of 8 LF (2.4 lm).
			3. Do not proceed with remaining work until workmanship is approved by Architect.
			4. Rework mock-up as required to produce acceptable work.
			5. Retain mock-up during construction as quality standard.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two choices for final disposition of mock-up.

* + - 1. Remove and legally dispose of mock-up when no longer needed.
			2. Incorporation: Incorporate mock-up into final construction.
		1. Preinstallation Meetings: Conduct meetings including Contractor, Architect, fabricator, installer and other subcontractors whose work involves cable railing system to verify project requirements, framing and support conditions, mounting surfaces and manufacturer's installation. Comply with Division 1 requirements.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Store products in manufacturer's unopened packaging until ready for installation.
		2. Handle and store products according to manufacturer's recommendations. Leave products wrapped or otherwise protected and under clean and dry storage conditions until required for installation.
		3. Exercise care not to scratch, mark, dent, or bend metal components during delivery, storage, and installation
	2. SEQUENCING
		1. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
		2. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
	3. PROJECT CONDITIONS
		1. Verify actual openings by field measurements before fabrication; show recorded measurements on shop drawings.
		2. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Johnson Architectural Hardware, Div. of C. Sherman Johnson Co., Inc., which is located at:1 Matthews Dr.East Haddam, CT 06423Toll Free Tel: 800-874-7455Tel: 860-873-8697Fax: 860-873-8589Email: [request info (Info@csjohnson.com)](https://arcat.com/rfi?action=email&company=Johnson%252BArchitectural%252BHardware%252C%252BDiv.%252Bof%252BC.%252BSherman%252BJohnson%252BCo.%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(05720csj)%253A%2520&coid=40915&spec=05720csj&rep=&fax=860-873-8589);Web: <http://www.csjohnson.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
		3. Provide all cable, materials, fittings and components from a single manufacturer.

\*\* NOTE TO SPECIFIER \*\* Select size of cable and fittings required and delete those not required. 1x19 wire rope is used for most railing applications. 1x19 has higher tensile capacity and is more resistant to bending and deformation under load. Typically 3 mm (1/8 inch) to 6 mm (1/4 inch) is used for cable infill. The fittings and size of cable to be used can be selected by Architect from Johnson product literature and load tables. Contact Johnson for assistance in determining the fittings and correct cable size for your application.

* 1. MATERIALS

\*\* NOTE TO SPECIFIER \*\* Select the cable size and type required to suit the performance requirements of the project. 3/16 inch cable is typically used for most railing applications. In high traffic applications such as airports, stadiums or amusement parks, 1/4 inch cable is highly recommended. For residential applications where view and unobtrusiveness are paramount, 1/8 inch cable is often used. In addition, heavier cable is recommended in locations where the bottom cable may be subjected to more stress such as conditions when it may be used as a footrest.

* + 1. Cables: ASTM A 492, Type 316 stainless steel, polished finish, commercial, dry grade.

\*\* NOTE TO SPECIFIER \*\* Select one of the following paragraphs to suit the performance requirements of the project. 1x19 cable is a semi-rigid, low-stretch cable, used for long straight runs and typically used for most rail applications. 7 x 7 cable is a semi-flexible cable used for short runs up to 25 feet and decorative corners. Note that while 7x7 cable is not as sturdy as 1/19 cable it is slightly less expensive. 7 x 19 cable is a very flexible cable similar to winch cable that is not recommended for rail systems and is typically used for decorative purposes only. Typical breaking strength for 1x 19 is: 1/8 inch - 2,100 lbs, 3/16 inch - 4,700 lbs, 1/4 inch - 8,200 lbs, 3/8 inch - 17,500 lbs. Typical breaking strength for 7x7 is: 1/8 inch - 1,700 lbs, 3/16 inch - 3,700 lbs, 1/4 inch - 6,100 lbs, 3/8 inch - 12,600 lbs.

* + - 1. Straight Runs: 1/8 inch (3 mm) diameter, 1x19.
			2. Straight Runs: 3/16 inch (5 mm) diameter, 1x19.
			3. Straight Runs: 1/4 inch (6 mm) diameter, 1x19.
			4. Straight Runs: 3/8 inch (9.5 mm) diameter, 1x19.
			5. Straight Runs under 15 feet: 1/8 inch (3 mm) diameter, 7x7.
			6. Straight Runs under 15 feet: 3/16 inch (5 mm) diameter, 7x7.
			7. Straight Runs under 15 feet: 1/4 inch (6 mm) diameter, 7x7.
			8. Straight Runs under 15 feet: 3/8 inch (9.5 mm) diameter, 7x7.
		1. Fittings: Type 316 stainless steel, vibratory/tumbled finish. Provide fittings required for attachment and connection of stainless steel cable and infill to support framework and substrates.
			1. Cable Attachment Method:

\*\* NOTE TO SPECIFIER \*\* Select one of the following methods of attaching cable to fittings and delete those not required. Machine Swaging is stronger and more aesthetically pleasing where the cable attaches to the fitting but requires a cable fabricator. Hand Crimping is possible only with 1/8 and 3/16 inch cable. Hand Crimping method allows for easy field installation. Mechanical terminals are more expensive and are typically not recommended for guardrails.

* + - * 1. Machine Swaging: Machine swaged by cold-forming press, with smooth surface and can achieve full cable strength in fitting connection.
				2. Hand Crimping: Hand crimped for in-field installations.
				3. Mechanical Terminals: Mechanical terminal with full cable strength in fitting connection.
				4. As recommended by the fabricator and approved by the Architect.
			1. Turnbuckles:

\*\* NOTE TO SPECIFIER \*\* Turnbuckles come in many different attachment styles and designs. Metal or wood railing frameworks require careful selection of turnbuckles to ensure a safe and logical railing system. There are many way to achieve the same guard rail goal with different turnbuckles. Select from the following series of turnbuckles and choose the end attachment style that best suits your needs for the type of framework you design. Select one of the following Series of turnbuckles and end attachment styles and delete those not required.

* + - * 1. Terminal Tuner Turnbuckle Series available in "Button", "Ball" and "Bevel" end attachments.
				2. Classic Turnbuckle Series available in Jaw, Deck Toggle, Button, Ball and Swage to Swage end attachments.
				3. Shortie Turnbuckle Series available in Jaw, Deck Toggle, Button, Ball and Swage to Swage end attachments.
				4. Decko Turnbuckle Series available in Jaw, Deck Toggle, Button, Ball and Swage to Swage end attachments.
				5. Smooth Line Turnbuckle Series available in Jaw, Deck Toggle, Button, Ball and Threaded Terminal end attachments.
				6. Threaded Terminal Series available in 1/8 inch to 3/8 inch cable sizes.
				7. Terminator Turnbuckle Series available in threaded and blind thread versions.
				8. As recommended by the fabricator and approved by the Architect.
			1. End Fittings:

\*\* NOTE TO SPECIFIER \*\* Select one of the following end attachment methods.

* + - * 1. Jaw End Fitting.
				2. Smooth Line Jaw End Fitting.
				3. Button End Fitting.
				4. Smooth Line Button End Fitting.
				5. Deck End Fitting.
				6. Smooth Line Deck End Fitting.
				7. Ball End Fitting.
				8. Smooth Line Ball End Fitting.
				9. Button end w/ 30 degree angled washer.
				10. As recommended by the fabricator and approved by the Architect.
		1. Vertical Balustrade Rods: Solid stainless steel rods, AISI Type 316 complying with ASTM A 276.
			1. Size: Diameter: 1/4 inch (6 mm).
			2. Rod termination:

\*\* NOTE TO SPECIFIER \*\* Select one top and one bottom rod termination method.

* + - * 1. Top End: Ball top, 5/8 inch (16 mm) diameter.
				2. Top End: Button top, 9/16 inch (14 mm) diameter.
				3. Bottom End: Threaded for tensioning in bottom rail.
				4. Bottom End: Threaded for nut and washer.
	1. FINISH
		1. After fabrication, clean stainless steel cable, fittings, and other components in accordance with ASTM A 380.
		2. Finish components with AISI No. 4 brushed satin finish in accordance with ASTM B 912.
	2. FABRICATION
		1. Fit and shop assemble components in largest practical sizes for delivery to site.
		2. Tolerances: Verify dimensions on site prior to shop fabrication.
		3. Fabricate stainless steel in accordance with AISI Steel Product Manual and the manufacturers requirements.
		4. Shop fabricate to designs indicated on Drawings and to meet performance requirements specified.
		5. Shop fabricate fittings, interfacing parts and assemblies so that field cutting adjustments are not necessary.
		6. Coordinate requirements, dimensions and spacing's of cable railing system to ensure required drilled holes in supporting framework are correctly located.
		7. Make exposed joints butt, flush, and hairline.
		8. Accommodate expansion and contraction of members and building movement without damage to connections or members.
1. EXECUTION
	1. EXAMINATION
		1. Before beginning installation, verify that conditions installed under other sections are acceptable for installation of cable railing systems in accordance with manufacturer's installation instructions.
		2. Verify supporting posts and framework for stainless steel wire rope railings are prepared for attachment of anchors, fittings and cable, and transfer of calculated loads.
		3. If conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
	2. PREPARATION
		1. Clean surfaces thoroughly prior to installation.
		2. Verify alignment, support dimensions, and tolerances are correct.
		3. Inventory components to ensure all required items are available for installation. Inspect components for damage. Remove damaged components from site and replace.
	3. INSTALLATION
		1. Install cable infill system in accordance with manufacturer's instructions and the approved shop drawings.
		2. Provide anchorage devices and fittings to secure to in-place construction; including threaded fittings for concrete inserts, toggle bolts and through-bolts.
		3. Install cable infill system plumb, level, square, and rigid without kinks or sags.
		4. Anchor cable railing system to mounting surfaces as indicated on the drawings.
		5. Separate dissimilar materials with bushings, grommets or washers to prevent electrolytic corrosion.
		6. Use manufacturer's supplied cable hardware.
		7. Ensure cables are clean, parallel to each other, and without kinks or sags.
		8. Tension cable to 350 lbs.
		9. After final adjustment provide tamper resistant locktight materials on all fittings. Verify that materials are a non-permanent-locking type that permits the fittings to be re-adjusted without destroying the fittings
	4. ADJUSTING AND CLEANING
		1. Adjust cable tension and connecting hardware.
		2. Remove temporary coverings and protection of adjacent work areas. Clean installed products in accordance with manufacturer's instructions before owner's acceptance.
		3. Do not use abrasive cleaners.
		4. Remove from project site and legally dispose of construction debris associated with this work.
	5. PROTECTION
		1. Protect installed products until completion of project.
		2. Protect installed products and finished surfaces from damage during construction.
		3. Repair or replace damaged products before Substantial Completion.

END OF SECTION