

# Stainless Cable Systems

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Part of Macalloy's range of Adjustable Structural Products

## Stainless Steel Cable Systems Applications: Cross Bracing

The Macalloy SC460 stainless steel cable system is an extension of the existing Macalloy Tension Structures product collection, and beautifully compliments the Tension Bar and Compression Strut range. Designed with functionality and aesthetics in mind, these cable systems are engineered to ensure a seamless connection between the cable and the universally recognised Macalloy clevis fork, resulting in an architectural consistency throughout the range.



The unique views of the coastal landscape of Helsinki are not obscured by the structural bracing, the small profile of the cable used in this bracing application offers an improved aesthetic solution for the bridge structure.

Nokia Building, Espoo, Finland. 26mm 1x19 strand cable in Nokia HQ

## Stainless Steel Cable Systems Applications: Suspended Structures

Offering full adjustability within the cable assemblies, the Macalloy SC460 system is the ideal solution for all your structural and architectural cable needs.



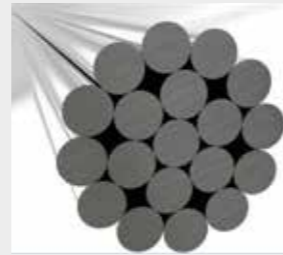
The Reflective Flow Chandelier is the world's biggest interactive chandelier, suspended in a glass atrium it features over 2,300 hand ground crystals and 165,000 LED units. The structure weighing an incredible 18,000kg is suspended using stainless steel cable supplied by Macalloy.

Reflective Flow Chandelier, Qatar. Designed by Beau McClellan. Installation by Unusual Rigging and Engineering LLC.

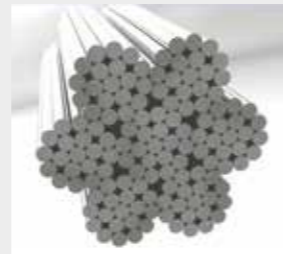
# Stainless Cable Systems

The Macalloy SC460 cable system is manufactured from a combination of high tensile austenitic stainless steel cable, specifically grade 1.4401 (S316), alongside S316 and Duplex component materials, which ensures outstanding resistance to corrosion. While there are many types of cable constructions available, the following illustration outlines three commonly used types of stainless steel cable.

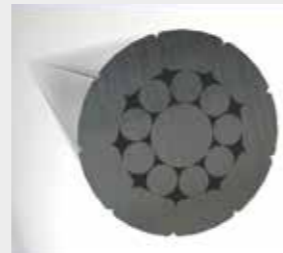
**1 X 19 STRAND** is the most common cable used. A rigid strand, with a high minimum break load and low stretch characteristics. The wires have a smooth bright finish.



**7 X 19 STRAND** is the most flexible of the cable types available. It has the lowest break load of the three cable types but it is often used in low load applications where the flexibility is required.



**COMPACT STRAND** is the most rigid of cables with very low stretch characteristics and high tensile strength. This cable has a high resistance to damage and in sizes 6mm and above offers a breaking load approx. 25% higher than the 1x19 wire strand.



There are a range of different standard components available, each to suit different architectural preferences and different budgets. Irrespective of the system chosen, all components are made from austenitic or duplex stainless steels. Swaged fittings are factory swaged to the cable. All components for our cable systems are designed to match the minimum break load of the 1x19 strand cable.



## Cable Stretch

Cables undergo an initial, permanent stretch. This can be between 0.10% and 0.75% dependent on the loading and type of cable. Further elastic stretch will then be proportional to the load applied and cable used. Elastic stretch can be calculated using the following formula:

$$d = \frac{\text{Load (kN)} \times \text{Length (mm)}}{E \text{ (kN/mm}^2\text{)} \times \text{Cross Sectional Area (mm}^2\text{)}}$$

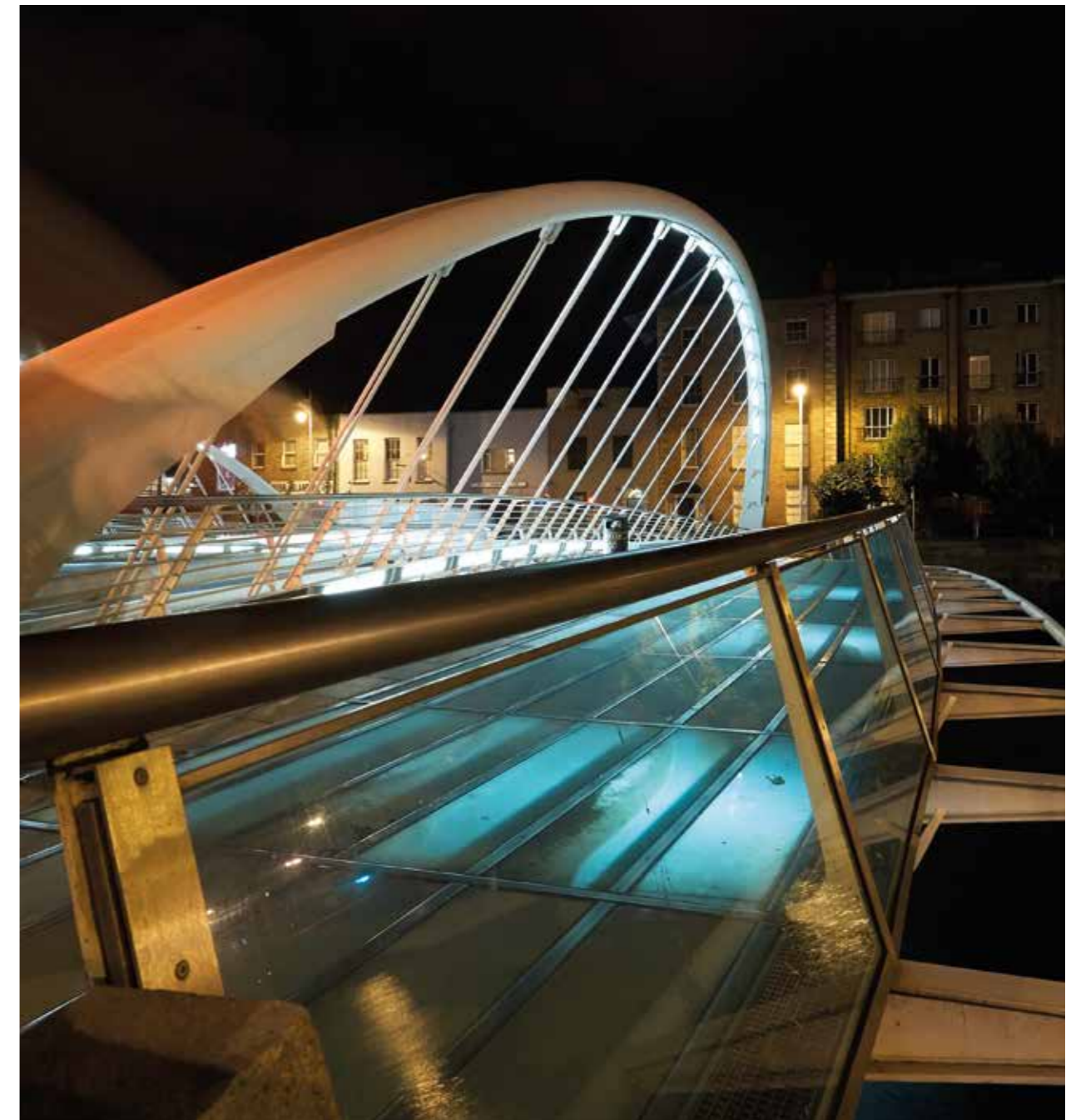
Where E =

7 x 19 Strand = 85 kN/mm<sup>2</sup>

1 x 19 Strand = 107 kN/mm<sup>2</sup>

Compact Strand = 133 kN/mm<sup>2</sup>

All cables are supplied non pre-stretched, if pre-stretched cables are required please request at time of the enquiry or order.



James Joyce Bridge, Dublin, Ireland Architect - Santiago Calatrava

# Assembly and Installation

The cable systems are delivered to site preassembled and coiled, ensuring ease of installation while minimizing packing and transportation costs. Please refer to the drawings below for detailed information regarding the standard cable assembly configurations\*.

\*Please note that Macalloy also offer non-standard cable systems upon request.

## SC460 Swaged Fork / Tensioner

1. Remove pins using suitable allen key and screw conical nuts away from all components as far as the thread will allow.



2. Position cable in place and secure with pins, tighten with suitable allen key.



3. Swaged tensioner and inline tensioner adjustments, while holding the swaged threaded studs, turn the tensioner using an open-ended spanner until correct level of adjustment or tension is achieved.



4. Then screw conical nuts back against the components assembly and installation are complete.

## SC460 Swaged Adjustable Fork

Follow steps 1, 2 and 4 of the above installation instructions

3. Swaged Adjustable fork adjustments, use open ended spanner on each swaged threaded stud and simultaneously turn each stud to induce load / adjustment, until correct level of tension achieved



Where a set load is required, the use of a torque wrench would be suitable, please contact Macalloy's technical team, [technical@macalloy.com](mailto:technical@macalloy.com) or [siteservices@macalloy.com](mailto:siteservices@macalloy.com), for details on the torque and equipment.

## Fork / Gusset Plate Misalignment



Forks should be kept in plane and perpendicular to each other on all Macalloy Cable Systems.



Use of horizontal gusset plates should be avoided to prevent loads in gusset plates due to bar weight.

## Spherical Bearings

Max = 0.5°



Standard Arrangement

Max = 5.9°



Additional misalignment with spherical bearing

The standard Macalloy fork accommodates misalignment between gusset plates of up to 0.5 degrees. In instances where alignment surpasses 0.5 degrees, larger forks can be utilised within the cable assembly, and a spherical bearing is incorporated into the gusset plate, which will allow for up to 5.9 degrees articulation at the clevis fork ends.

## ISOLATION

Materials composed of different metals, such as carbon steel and stainless steel, should be separated to avoid bimetallic corrosion. Macalloy provides isolation washers for clevis forks, alongside isolation sleeves for pin sets, which serve as a protective barrier where applications require a stainless cable fork/pin to be connected to a carbon steel structure.





#### HAMAD INTERNATIONAL AIRPORT, (DOHA) QATAR.

The airport was voted the worlds best in the 2021 Skytrax World Airport Awards. The dramatic, curving building is designed to represent ocean waves and sand dunes. Doha international airport is the home of Qatar airlines and can handle 29 million visitors per year. On this project, Macalloy supplied three diameters of stainless cables; 12mm, 16mm and 22mm that supports the glass facades in conjunction with Macalloy's stainless 24mm tension bars.



**BIRMINGHAM UNIVERSITY, DUBAI.** This is a stunning mesh canopy, designed to provide shade in the courtyard area of the new International Birmingham Campus Hub in Dubai. Macalloy supplied Khansaheb Construction Company with 42 No. 26mm 316 stainless steel cable systems, complete with a fixed M36 fork at one end, and a swaged tensioner/ M36 fork at the opposite end.



**THE SHARD, LONDON.** Positioned against the backdrop of The Shard's exterior, and using Macalloy's SC460 cable system, one figure from the 'WE' art installation hovers in contrast to its stationary counterpart, located in The Shard's piazza, creating the theme of reflection. Both figures are crafted from letters and symbols derived from seven different alphabets, symbolizing diversity and inclusion. Macalloy supplied the SC460 Swaged Fork / Tensioner system with a Ø10mm 1 x 19 strand, M16 SS Forks and Spherical Bearings incorporated in the pin connection.



ETA - 21/0053 Tension Rod Systems  
BSEN ISO 9001: 2015



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