

## STAINLESS STEEL WIRE ROPE

### Wire Rope Basics

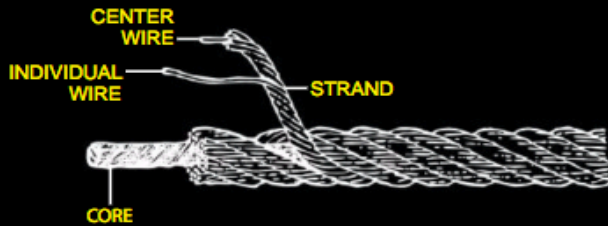
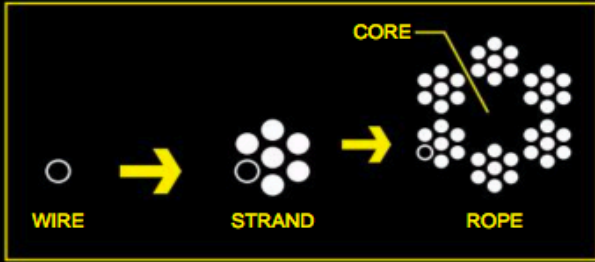
High Tensile Architectural cable Systems

Wires are the basic building blocks of wire rope, and are manufactured by "drawing down" rod to specific sizes required.

These wires are then organized to lay around a "centre" in a specified pattern, in one or more layers, to form a strand.

Strands then lay around a "core" to form a wire rope.

Wire rope is constructed with dozens – even hundreds of individual wires, which are formed or fabricated to move or operate at close tolerance to one another.



The size and number of wires in each strand, as well as the size and number of strands in each wire rope, determines the flexibility and the resistance to abrasive wear.

Each wire rope and strand has many variable components that are important to understand so that you are able to choose the appropriate product for your industry. These components include:

1. Construction;
2. Size/Diameter;
3. Lay;
4. Core;
5. Preforming;
6. Tensile Strength; and
7. Types of Wire Used.

### Wire Rope Construction

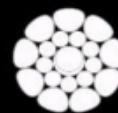
Architectural spiral strand cable systems

The wire rope and strand constructions currently available in the HAMMA range are illustrated below.

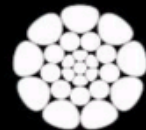
with Micro-stretch Technologies™  
**hamma-Pro**  
STRAND



1x7

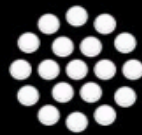


1x19



1x25

**hamma-X**  
STRAND



1x19

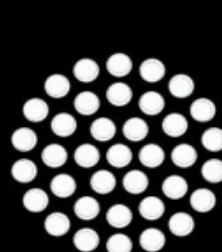


7x7

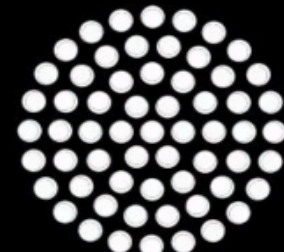


7x19

**hamma-Mega**  
STRAND



1x37



1x61

## STAINLESS STEEL WIRE ROPE

### Wire Rope Cores

Stainless steel spiral strand cable systems

The primary function of the rope's core is to serve as the foundation for the strands – to keep the rope round and the strands properly positioned during operation.

The three types of cores commonly used are:

#### Fibre Core (FC)

Polypropylene is standard. A fibre core provides maximum flexibility and elasticity to the wire rope allowing for use where flexible wire rope is required (e.g. pulley systems)

#### Independent Wire Rope Core (IWRC)

Literally an independent wire rope with strands and a core – most wire ropes made with steel core use an IWRC.

#### Strand Core

A strand made of wires these cores are used mainly for standing or guying rigging. They generally have a high tensile strength and have greater resistance to corrosion due to the larger strands of the wire rope.

### Wire Rope Preforming

Stainless Steel tensile cable systems

Preforming pre-shapes strands before the rope is closed.

Preforming helically shapes the wires and strands into the shape they will assume in the finished rope. It improves handling and resistance to kinking by conforming the strands to the position they take in the rope.

The superior qualities of preformed ropes result from wires and strands being "at rest" in the rope, which minimizes internal stresses within the rope.

Today, preforming is virtually standard in most ropes, with the exception of specialty ropes.

### Wire Rope Tensile Strength

Architectural spiral strand cable systems

Tensile strength is a measure of the ability of a material to withstand a longitudinal stress, expressed as the greatest stress that the material can stand without breaking.

Wire rope is commonly manufactured to the following tensile strengths:

1. 1570Mpa
2. 1770Mpa
3. 2070Mpa
4. 2250Mpa

### Types of Wire Used in Ropes

Architectural spiral strand cable systems

#### Stainless Steel Wire

This is the specialty wire of HAMMA. It has high resistance to many corrosive conditions and is used extensively in yacht rigging and architectural applications.

#### Galvanised Wire

Galvanised wire is essentially a bright wire (see below) covered in zinc. The zinc coating allows the bright wire to become corrosion resistant. The corrosion resistance is lower than stainless steel, however, it may be more cost effective than stainless steel wire if suitable for a specific application.

#### Bright Wire

Most ropes are made with uncoated (bright) wire that is manufactured from high-carbon steel. The chemistry of the steel used and the practice employed in drawing the wire are varied to supply the ultimate combination of tensile strength, fatigue resistance and wear resistance in the finished rope.

### Stainless Steel Grade Selection

Architectural spiral strand cable systems

HAMMA stocks **Grade 316** stainless steel wire rope, and is able to source Duplex, including 2205. Due to harsh local conditions, we recommend the use of **Grade 316** for most applications, especially when use will be close to the coast. **Grade 316** has a higher corrosion resistance than **Grade 304**.

Corrosion occurs when the iron in steel naturally reacts with oxygen in the presence of water or air moisture to create iron oxides – commonly known as rust. If salt is present in the air moisture then steel tends to rust more quickly as it accelerates the electro-chemical reaction.

Stainless steel protects from corrosion by creating a "passivation layer" of Chromium (III) Oxide. This passivation layer stops oxygen from reacting with the iron. Stainless steel requires a minimum of 10.5% chromium content by mass to create the protective oxide film. Detailed below is the typical chemical composition of **HAMMA Wire**.

HAMMA Wire – Typical Chemical Composition				
Grade	Carbon (C)	Chromium (Cr)	Nickel (Ni)	Molybdenum (Mo)
304	0.05%	18.5%	8.5%	0%
316	0.05%	17.0%	11.0%	2.1%