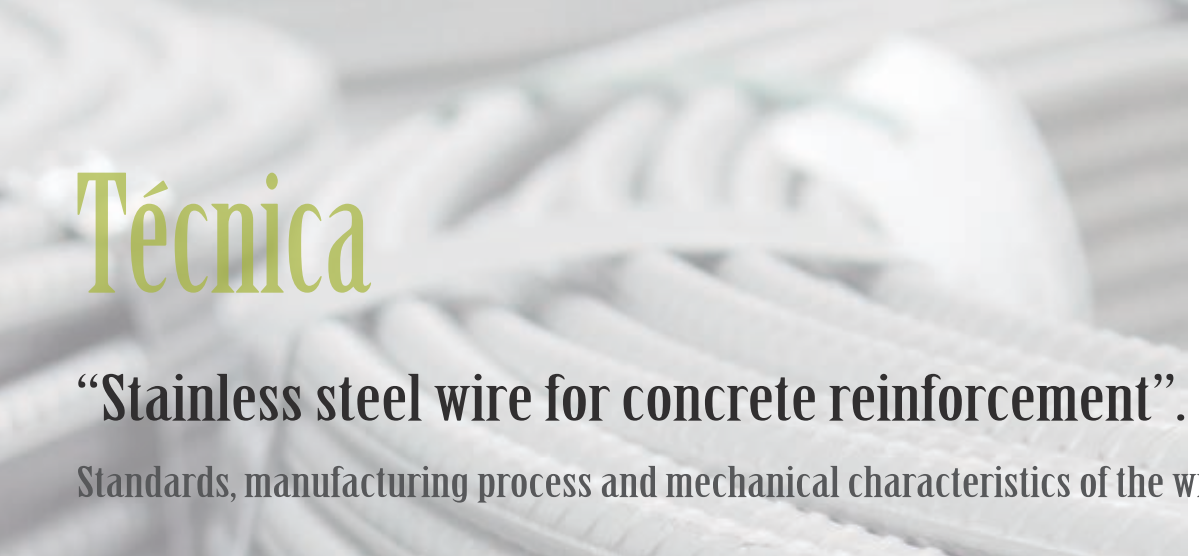


Técnica

“Stainless steel wire for concrete reinforcement”.

Standards, manufacturing process and mechanical characteristics of the wire.

The recent publication of the standard UNE 36067-2017, updates Spanish standard to the current state of the art, basically concerning stainless steel wire grades usable for concrete reinforcements. The aim of this article is to explain the difference between the previous 1994 version and the new standard. We will also discuss the wire manufacturing process and the mechanical properties obtained after the material cold drawing.

1. STANDARD

The former version (UNE 36067:1994) “Austenitic stainless steel ribbed bars and wire for the reinforcement of concrete”, therefore only the austenitic grades were allowed for ribbed wires. In addition, old standard classified ribbed wires into two types; B500 T INOX and B600 T INOX, meaning B “steel type for the use in concrete reinforcement” and numbers 500 or 600 the minimum nominal yield strengths. Letter T indicative of “Trefilado” (cold drawing process) and INOX meaning “Stainless Steel”

This new revision UNE 3067:2017 changes its tittle to “Stainless steel wire for the reinforcement of concrete”, and extends the field of stainless steel types used as reinforcement or mesh (to other ferritic, austenitic and duplex grades) and it is not only focused on ribbed wire but also in indented wire.

Finally, this new edition reduces to a single type B500 T INOX instead of two in the previous one.

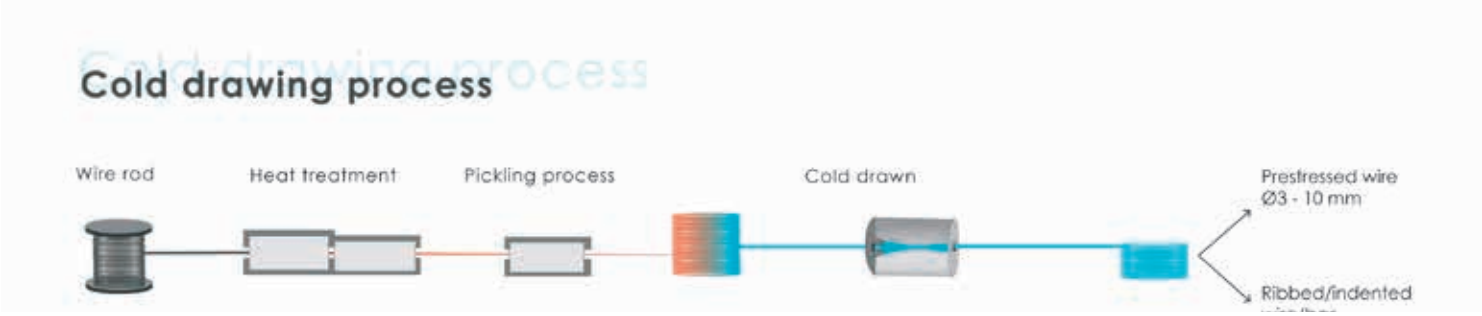
This unification has tried to join criteria with the existing standard of carbon steel wire for reinforcement to make it easier the application of stainless steels to technicians, used to work with carbon steel wire.

REMARK OF CEDINOX:

The update of Standard UNE 36067:2017 cancels and replaces the previous UNE 36067: 1994, which had become obsolete. This new edition of the standard establishes the chemical, geometric, mechanical and adjusted characteristics of weldable stainless steel ribbed or indented wires, up to 16 mm in diameter, supplied as a straight rod or in coil, for use in the reinforcement of concrete structures. The Inoxfil and Roldan factories of the Acerinox Group are manufacturers of this cold drawn ribbed/indented wire.

For the time being, it has not been possible to develop in parallel another Spanish ,UNE standard, covering the use of stainless steel rebars of higher diameters, supplied also as straight bar or in coil, which from the factories of the Acerinox Group (Roldan and NAS), are regularly supplying in diameters range between 16 and 50 mm , hot rolled (diameters 40 and 50 mm only in bar), because a future harmonized European standard to cover these products, that should replace in future the different existing national standards, is at present under development. Meanwhile a “status quo” situation prevents the development of new national European standards, on the same product.

Until the completion and approval of that mentioned European harmonized standard, Roldan from Spain and North American Stainless (NAS) from the USA, supply these products for various projects of important international infrastructures, under the most accepted current standards in existence (BS 6744-2016, with CARES certification which is normally applied for projects in Europe / Asia / Middle East, or ASTM A955 / A955M, American standard that is usually required in USA / Canada and other countries).



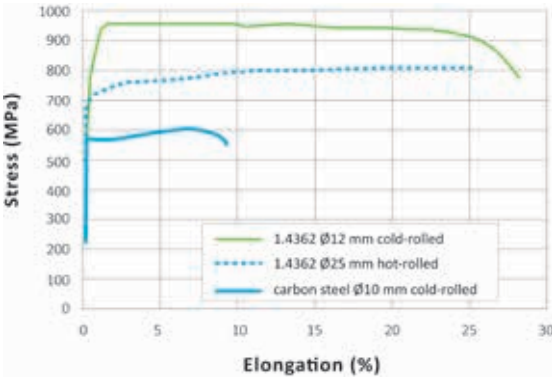
2. MANUFACTURING PROCESS

In diagram 1, the main processes for obtaining ribbed-indented wires are represented.

The raw material used is stainless steel hot rolled wire rod. After its rolling, wire rod must be heat threated to regenerate its structure (ferritic) or carbides solubilization (austenitic and duplex). Temperatures and conditions are different for each group. Next step is a pickling, process where the material acquires a clean and passive surface free from oxides and mill scale. The wire rod can then be cold drawn and ribbed or indented, by pressing it on the surface of ribbed rings. The number of rings marked could be 3 or 4, reverting in different surface sets of wire ribs. Inoxfil S.A *trancané* ribbed wire has 4 ribbed series and coils up to 1500kg. For more information about Inoxfil production possibilities enter http://www.acerinox.com/en/productos/producto-largo/Reinforcement-wire/

3. MECHANICAL CHARACTERISTICS OF RIBBED-INDENTED WIRE

Mechanical characteristics of ribbed-indented wires depend basically on their chemical composition, their structures and the production process. Cold forming or drawing, involves hardening of the metal that increases tensile strength and yield strength and reduces elongation. This hardening results higher in stainless steel than in carbon steel. Even though the minimum mechanical requirements for stainless steel are the same as for carbon steel types, the values obtained under the same process conditions will be higher for stainless steel, as we can see in diagram 1



FUENTE / *SOURCE*:
Inoxfil, S.A.
www.cedinox.es