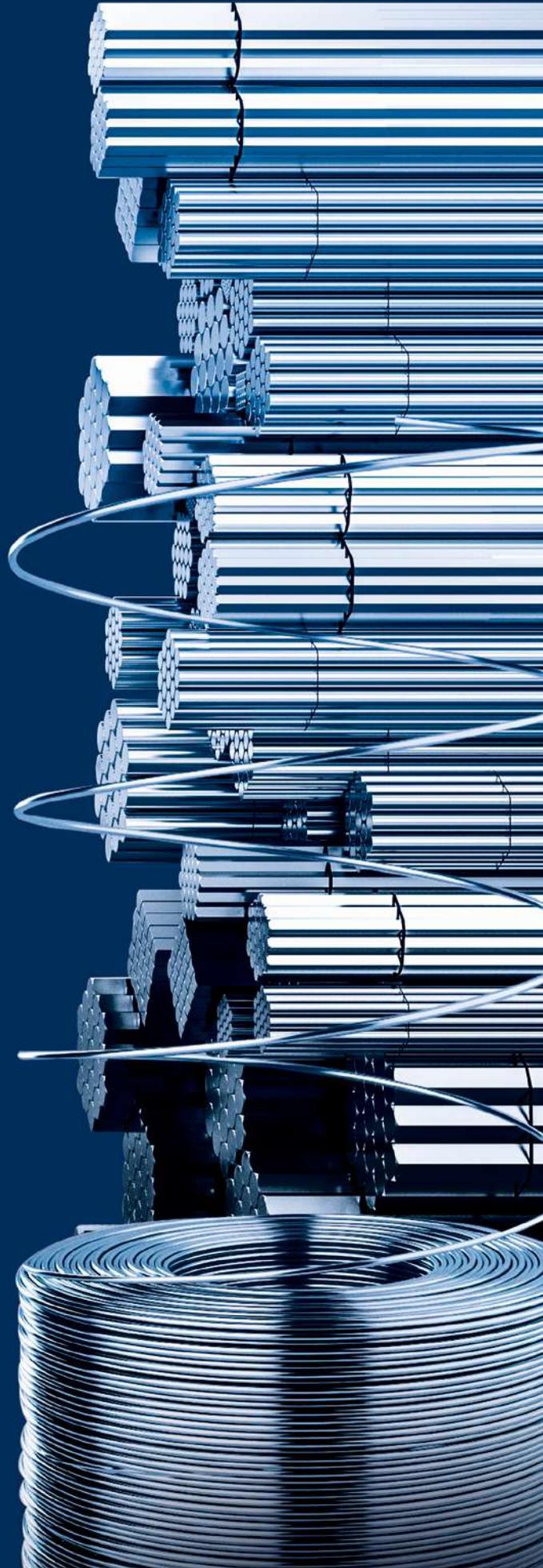


STAINLESS STEEL SOLUTIONS

Rodacciai[®]



STAINLESS STEEL SOLUTIONS

Rodacciai®





BARS

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COMPANY PROFILE



ALMOST 70 YEARS OF EXPERIENCE IN STEEL BUSINESS

Today the Rodasteel Group is an international leader in the production and processing of steel. Our production and sales locations on three continents (Europe, Asia and America) provide Rodasteel with a widespread sales network to distribute finished products in stainless steels, alloy steels and carbon steels all over the world. The secret of this success is based on an extensive and diversified range of high quality products, on paying attention to the customers, on the ability to innovate continuously and on the experience of Rodasteel people, who know how to identify upcoming market shifts and opportunities.

1956

Foundation of
Trafileria Roda & C.
by Giuseppe Roda

1960

Introduction of lead alloy
steel processing, considered
to be the best in the world

1971

Construction of
the new plant
in Bosisio Parini

1981

Construction of the
Sirone plant, with the
rolling mill

1984

Trafileria Roda & C
becomes
Roda Acciai company

Rodacciai was born in Pusiano (Como) in 1956, when Trafiliera Roda & C. was founded by the charismatic and innovative entrepreneur Giuseppe Roda. Started as a small local company for steel bar cold drawing, in 1960 Trafiliera Roda & C. embarked on a path of production verticalisation along the steel processing chain. Thanks to the installation of a hot-working plant, the company expanded its original offer beyond semi-finished cold pressed products, becoming, during the

years, an international group in the steel processing sector. The group is made by two companies: Rodacciai S.p.A. (Italy) and Aceros Inoxidables Olarra S.A. (Spain). Transparency, integrity and passion are the main values for the entire group, based on them every decision and action are taken. These principles drive all Rodasteel activities and are the basis of the group's Code of Ethics.



1994

1995-2005

2007-2016

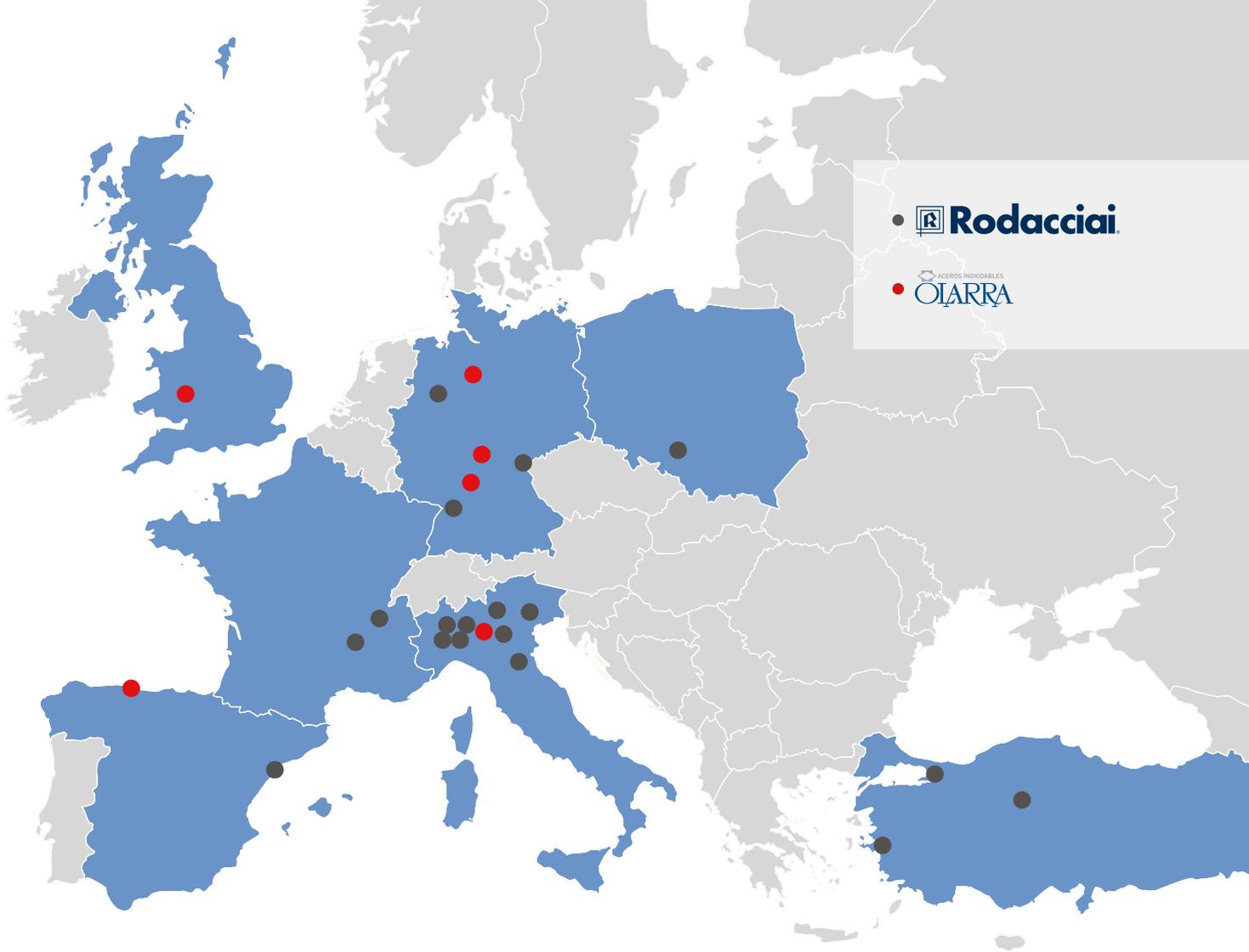
2024

Acquisition of the company Olarra Aceros Inoxidables

Expansion of the commercial network in Europe and acquisition of smaller companies

Investments for production expansion

Today, Rodasteel Group is a benchmark in the steel production and processing sector



8 covered nations



27 distribution centres

EUROPE

Rodacciai

Country: Italy
N° of distribution centres: 6
Cities: Bosisio Parini, Torino, Bergamo, Brescia, Padova, Bologna

Rodastahl

Country: Germany
N° of distribution centres: 3
Cities: Deisslingen, Hagen, Oelsnitz

Rodastal PL

Country: Poland
N° of distribution centres: 1
Cities: Gliwice

Rodacciai S L

Country: Spain
N° of distribution centres: 1
Cities: Barcelona

BİMEKS ÇELİK

Country: Turkey
N° of distribution centres: 3
Cities: Istanbul, Ankara, Izmir

Euroda Aciers

Country: France
N° of distribution centres: 2
Cities: Cluses, Chasse sur Rhône

COESI

Country: Italy
N° of distribution centres: 1
Cities: Piacenza

ALFER

Country: Italy
N° of distribution centres: 1
Cities: San Giuliano Milanese

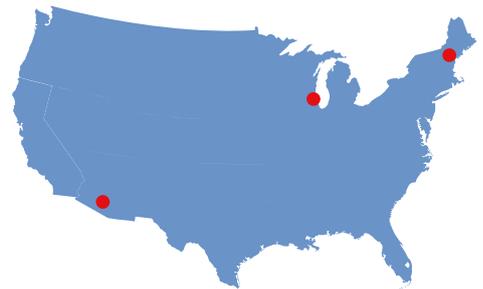
ISM

Country: Germany
N° of distribution centres: 3
Cities: Mulhem, Vaihingen, Francoforte

OIARRA

Country: Spain
N° of distribution centres: 1
Cities: Bilbao

USA



OIARRA - Italia

Country: Italy
N° of distribution centres: 1
Cities: Brescia

OIARRA U.K LTD

Country: Great Britain
N° of distribution centres: 1
Cities: Cleobury Mortimer

Roda Specialty Steel

Country: USA
N° of distribution centres: 3
Cities: Los Angeles, Chicago, New Jersey



DINAMICITY, INNOVATION AND RESILIENCE

The vertical integration achieved over the years by Rodasteel Group, thanks to the acquisition of Olarra and the implementation of the production facilities, offers an important competitive advantage: independency along the entire value chain, which can be translated in our slogan “from the scrap to the finished product”.



Olarra,
Bilbao (steel mill)



Rodacciai,
Bosisio Parini (cold finishing plant)

Rodacciai,
Sirone (rolling mill)



ALL IN HOUSE CONTROL STRATEGY & BUSINESS PROCESS REENGINEERING

The strategic choices, made in the past, have been allowing the Group to differentiate itself over the time.

It is precisely starting from these choices that the company is today a leader in the cold finished steel market.

Our strategy is composed by: **ALL-IN-HOUSE**, to guarantee our customers continuous product and process improvement. Each phase is monitored and tracked.

Business Process Reengineering logic identifies 8 phases, including the redefinition of processes, identification of the levels for change, the development of concrete objectives and actions for continuous improvements.

Rodacciai LAB, an important investment in our laboratory and R&D Dept., creates a high value for both the above explained strategy, helping the company to continuous monitoring the products in each singular step.



QUALITY CONTROL SYSTEM



Rodacciai works with innovative machinery and optimized production processes to guarantee constant and repeatable high quality products over time. Since 1990 the company has obtained the ISO 9001 system certification, which certifies full compliance with the standards relating to the Quality Management Systems.

In the continuous development of its Quality Policy, Rodacciai, through its production lines, is able to comply with all the necessary certifications for its products.

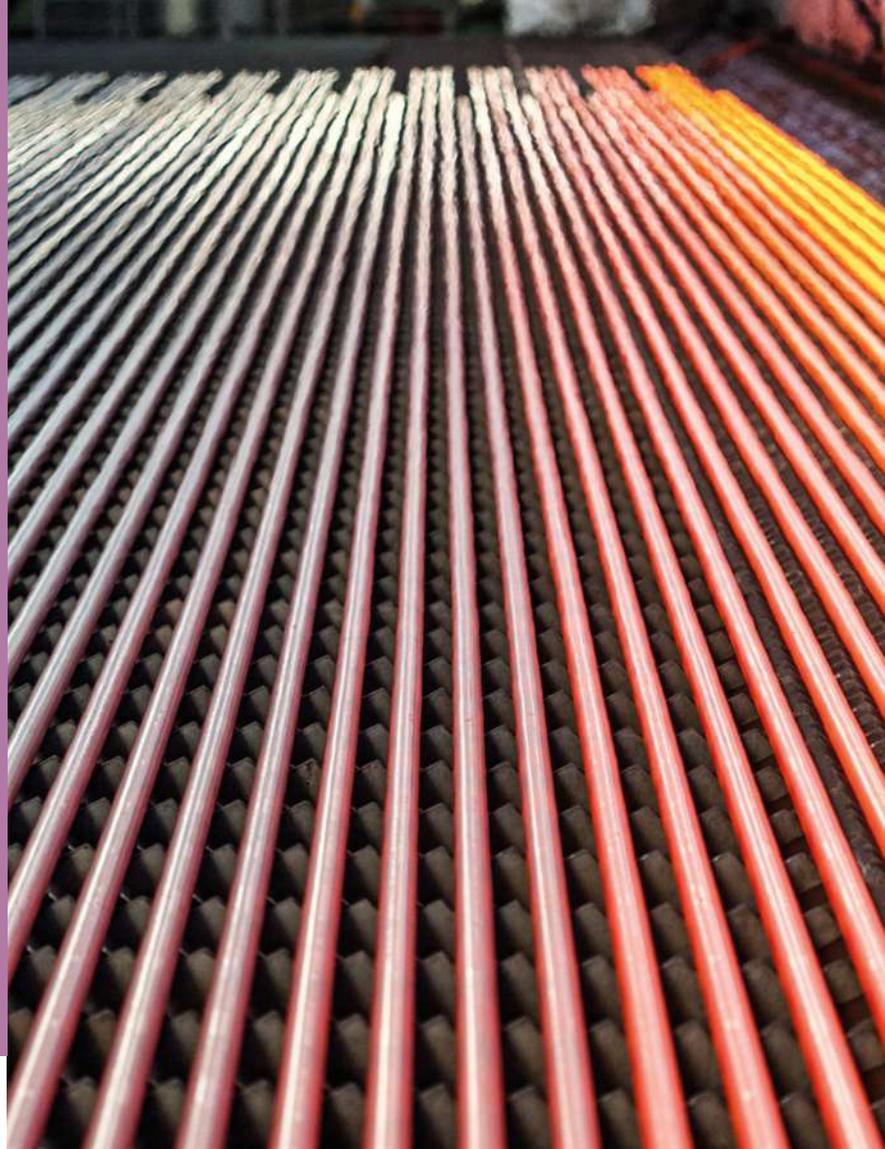


Rodacciai | LAB

LABORATORY & CONTROL QUALITY

Rodacciai LAB is a recent and big investment, dedicated to the R&D and to the continuous improvement of the products. It is composed by a laboratory fully furnished with all the necessary equipment and testing machines calibrated in accordance with the requirements of ISO 9001 standards. This allows to produce the majority of tests and reports inside the company.

COLD FINISHED BARS



Rodasteel Group, producing 80.000 tonnes of stainless steel bars yearly, has developed a high quality product range, including all the main steel grades and finishings.

The Group proposes on the market all the main standard grades and a wide range of tailor made products, studied on customer's specific requirements.

The stainless steel bars can be supplied in hot rolled or cold finished execution, in

all the main commercial grades, customizing the surface finishing.

All the heat treatments are made internally and the most common are: annealing, solution annealing (for austenitic stainless steel or precipitation hardening steels), quenching and tempering and precipitation hardening.

Rodacciai produces and sells stainless steel bars for all the main market applications and in a variety of shapes and sizes.

PRODUCTION RANGE AND EXECUTIONS

	Condition	Profile	Range (mm)	Finish	Tolerances
Bars	Hot rolled	Round	20÷100	As rolled, rough peeled	-
	Cold-drawn	Round	2÷40	Bright	ISA h9-h10-h11
		Hexagonal	4÷65		
		Square Special	4÷55		
Smooth-turned / peeled	Round	20÷80	Smooth and bright	ISA h9-h10-h11	
Ground	Round	3÷80	Smooth and bright	ISA h6-h7-h8-h9-h10-h11	

Different tolerances can be evaluated.

COLD FINISHED BARS APPLICATIONS



AUTOMOTIVE



OIL & GAS



HYDRAULIC & FLUID



FASTENERS

AUSTENITIC STAINLESS STEEL BARS

These steels are used in a field that requires material with good corrosion resistance property. The addition of a small amount of sulphur makes the material easily machined and suitable for the production of turned parts with complex machining operations.

FERRITIC STAINLESS STEEL BARS

These qualities are ideal for the production of grilles, household appliances components and in the automotive industry.

MARTENSITIC STAINLESS STEEL BARS

They are used in many fields thanks to the high mechanical properties that can be achieved; e.g. in the oil industry and for the manufacture of components for pumps and valves.

DUPLEX (AUSTENITIC-FERRITIC) STAINLESS STEEL

These materials are perfect in contexts where the action of salt and corrosive agents is particularly marked, they are also used in heat exchangers where an excellent corrosion resistance is important.

HEAT-RESISTANT STAINLESS STEEL BARS

They find application for components of heat treatment furnaces, heat pumps and chemical industry.

PRECIPITATION HARDENING STAINLESS STEEL BARS

These steels are typical where a combination of strength, corrosion resistance and mild toughness is required.

Some examples of applications can be Oil&Gas, nuclear power generations and chemical plants.



AUSTENITIC STAINLESS STEEL BARS

300 SERIES

Corrosion resistant, non-magnetic steels

In addition to chromium (the common element of all stainless steels), austenitic stainless steels contain high level of nickel, which significantly improves the steels resistance to corrosion. Adding different alloy elements - such as molybdenum, titanium, niobium, copper etc. – it is possible to achieve specific design properties and performances. Cold drawing allows the possibility to achieve slight residual magnetism on the bars, which is not present on the hot rolled condition. Austenitic stainless steels are used in a great variety of applications, such as cold heading and automotive parts. The steels of the PLUS series are calcium treated and include sulphur for improved machinability. In order to satisfy the growing market demand for the material with an excellent machinability, R&D department developed a new quality: “304HF”.

	EN 10088-3: 2014 EN 10263-5: 2017	N°	AISI-UNS	ISO number	C (max)	Si (max)	Mn (max)	P (max)	S (max)	N (max)	Cr	Ni	Other elements
204CU	X8CrMnCuN17-8-3	-	-	4597-204-76-I	0,10	1,00	6,5÷9,0	0,040	0,030	0,10÷0,25	15,5÷17,5	1,5÷3,5	Cu = 2,00÷3,50 Mo max = 1,00
302	X10CrNi18-8	1.4310	302 S30200	4310-301-00-I	0,05÷0,15	2,00	2,00	0,045	0,015	0,10	16,0÷19,0	6,0÷9,5	Mo max = 0,80
303PLUS	X8CrNiS18-9	1.4305	303 S30300	4305-303-00-I	0,10	1,00	2,00	0,045	0,15÷0,35	0,10	17,0÷19,0	8,0÷10,0	Cu max = 1,00
GVR	X6CrNiCuS18-9-2	-	303+Cu S30331	4570-303-31-I	0,08	1,00	2,00	0,045	0,15÷0,35	0,10	17,0÷19,0	8,0÷10,0	Mo max = 0,60 Cu = 1,40÷1,80
304	X5CrNi18-10	1.4301	304 S30400	4301-304-00-I	0,07	1,00	2,00	0,045	0,030	0,10	17,5÷19,5	8,0÷10,5	-
304HF	X2CrNi18-9	1.4307	304L S30403	4307-304-03-I	0,07	1,00	2,00	0,045	0,020÷0,030	0,10	17,5÷19,5	8,0÷10,5	-
304PLUS	X2CrNi18-9	-	304L S30403	4307-304-03-I	0,030	1,00	2,00	0,045	0,020÷0,030	0,10	17,5÷19,5	8,0÷10,5	-
304ST	X2CrNi19-11	1.4306	(321 S32100)	4541-321-00-I	0,030	1,00	2,00	0,045	0,030	0,10	18,0÷20,0	10,0÷12,0	-
304CU	X3CrNiCu18-9-4	1.4567	304L S30403	4306-304-03-I	0,04	1,00	2,00	0,045	0,030	0,10	17,0÷19,0	8,5÷10,5	Cu = 3,0÷4,0
316	X5CrNiMo17-12-2	1.4401	302HQ S30430	4567-304-30-I	0,07	1,00	2,00	0,045	0,030	0,10	16,5÷18,5	10,0÷13,0	Mo = 2,00÷2,50
316TILS	X6CrNiMoTi17-12-2	1.4571	316 S31600	4401-316-00-I	0,08	1,00	2,00	0,045	0,020÷0,030	-	16,5÷18,5	10,5÷13,5	Mo = 2,00÷2,50 Ti = 5x%C÷0,70
316PLUS	X2CrNiMo17-12-2	1.4404	316L S31603	4404-316-03-I	0,030	1,00	2,00	0,045	0,020÷0,030	0,10	16,5÷18,5	10,0÷13,0	Mo = 2,00÷2,50
316CU	X3CrNiCuMo17-11-3-2	1.4578	316Ti S31635	4571-316-35-I	0,04	1,00	2,00	0,045	0,015	0,10	16,5÷17,5	10,0÷11,0	Mo = 2,00÷2,50 Cu = 3,0÷3,5
321SL	X6CrNiTi18-10	1.4541	316L S31603	4432-316-03-I	0,08	1,00	2,00	0,045	0,020÷0,030	-	17,0÷19,0	9,0÷12,0	Ti = 5x%C÷0,70
1.4435	X2CrNiMo18-14-3	1.4435	316L S31603	4435-316-91-I	0,030	1,00	2,00	0,045	0,030	0,10	17,0÷19,0	12,5÷15,0	Mo = 2,50÷3,00
347HF	X6CrNiNb18-10	1.4550	347H 347S31	-	0,04÷0,08	1,00	2,00	0,045	0,015	-	17,0÷19,0	9,0÷12,0	Nb = 10x%C÷1,00

* Typical analysis

AUSTENITIC HEAT-RESISTANT STEELS

300 SERIES

Corrosion resistant and high temperatures application steels

These steels have been created to be used in environments characterized by high temperatures - such as heat treatment ovens and resistors of radiating elements.

	EN 10088-1:2014 EN 10095: 1999	N°	AISI-UNS	C (max)	Si (max)	Mn (max)	P (max)	S (max)	N (max)	Cr	Ni
310	X8CrNi25-21	1.4845	(310S S31008)	0,10	1,50	2,00	0,045	0,015	0,11	24,0÷26,0	19,0÷22,0
314	X15CrNiSi25-21	1.4887	330Nb	0,20	1,50÷2,50	2,00	0,045	0,015	0,11	24,0÷26,0	19,0÷22,0
1.4828	X15CrNiSi20-12	1.4828	(309 - S30900)	0,20	1,50-2,50	2,00	0,045	0,015	0,11	19,0-21,0	11,0-13,0

FERRITIC STAINLESS STEEL BARS

400 SERIES

Corrosion-resistant, non-hardenable steels

Ferritic stainless steels can not be heat treated and quenched. However, their mechanical properties can be increased by work hardening through cold drawing. The corrosion resistance is ensured by the chromium content and further increased by the addition of molybdenum. Sulphur is added to enhance machinability. These steels are magnetic and commonly used in automotive applications, as well as in a variety of industrial uses.

	EN 10088-3: 2014 EN 10263-5: 2017	N°	AISI-UNS	ISO number	C (max)	Si (max)	Mn (max)	P (max)	S (max)	Cr	Mo	Other elements
430	X6Cr17	1.4016	430 S43000	4016-430-00-I	0,08	1,00	1,00	0,040	0,030	16,0÷18,0	-	-
430NB	X3CrNb17	1.4511	-	4511-430-71-I	0,05	1,00	1,00	0,040	0,030	16,0÷18,0	-	Nb=12xC÷1,0
1.4105	X6CrMoS17	1.4105	430F S43020	-	0,08	1,50	1,50	0,040	0,15÷0,35	16,0÷18,0	0,20÷0,60	-
434	X6CrMo17-1	1.4113	434 S43400	4113-434-00-I	0,08	1,00	1,00	0,040	0,030	16,0÷18,0	0,90÷1,40	-

DUPLEX STAINLESS STEEL BARS

AUSTENO-FERRITIC

Duplex (austenitic-ferritic) stainless steel, suitable for aggressive environments

Duplex stainless steels (Austeno-ferritic) have two-phase microstructure containing ferrite and austenite. Despite lower nickel content, they show excellent corrosion resistance and they can achieve high mechanical properties through cold drawing. These steels are suitable for marine and off-shore oil exploration. They are magnetic, can be welded but can not be heat treated and quenched. Duplex steels are still undergoing research and development to fully explore new uses and applications.

	EN 10088-3: 2014 EN 10263-5: 2017	N°	AISI-UNS	ISO number	C (max)	Si (max)	Mn (max)	P (max)	S (max)	Cr	Cu	Mo	N	Ni
2304	X2CrNiN23-4	1.4362	(2304 S32304)	4362-323-04-I	0,03	1,00	2,00	0,035	0,015	22,0÷24,5	0,01÷0,60	0,01÷0,60	0,05÷0,20	3,5÷5,5
AISI 329	X3CrNiMoN27-5-2	1.4460	(329 S32900)	4460-312-00-I	0,05	1,00	2,00	0,035	0,030	25,0÷28,0	-	1,30÷2,00	0,05÷0,20	4,5÷6,5
2205	X2CrNiMoN22-5-3	1.4462	2205 S31803	4462-318-03-Ig	0,03	1,00	2,00	0,035	0,015	21,0÷23,0	-	2,5÷3,5	0,10÷0,22	4,5÷6,5
2001	X2CrMnNiN21-5-1	1.4162	(2101 S32101)	4162-321-01-Eg	0,040	1,00	4,0-6,0	0,040	0,015	21,0÷22,0	0,10-0,80	0,10-0,80	0,20-0,25	1,35-1,90

MARTENSITIC STAINLESS STEEL BARS

400 SERIES

Corrosion-resistant, hardenable steels

Martensitic stainless steels typically have increased chromium content as well as higher carbon levels. These steels are suitable to be heat treated, quenched and tempered. They can be offered in the annealed condition with good machinability, enhanced by the addition of sulphur or in the quenched and tempered condition for increasing mechanical properties and corrosion resistance. High surface hardness can be achieved for these steels by induction hardening. Typical applications include high strength components for pumps and valves.

	EN 10088-3: 2014 EN 10263-5: 2017	N°	AISI-UNS	ISO number	C	Si (max)	Mn (max)	P (max)	S (max)	Cr	Other elements
410	X12Cr13	1.4006	410 S41000	4006-410-00-I	0,08÷0,15	1,00	1,50	0,040	0,030	11,5÷13,5	Ni = ≤ 0,75
416	X12CrS13	1.4005	416 S41600	4005-416-00-I	0,06÷0,15	1,00	1,50	0,040	0,15÷0,35	12,0÷14,0	Mo = ≤ 0,60
420A	X20Cr13	1.4021	420 S42000	4021-420-00-I	0,16÷0,25	1,00	1,50	0,040	0,030	12,0÷14,0	-
420B	X30Cr13	1.4028	420 S42000	4028-420-00-I	0,26÷0,35	1,00	1,50	0,040	0,030	12,0÷14,0	-
420C	X39Cr13	1.4031	420 S42000	-	0,36÷0,42	1,00	1,00	0,040	0,030	12,5÷14,5	-
420C1	X46Cr13	1.4034	420 S42000	-	0,43÷0,50	1,00	1,00	0,040	0,030	12,5÷14,5	-
430F	X14CrMoS17	1.4104	430F S43020	4019-430-20-I	0,10÷0,17	1,00	1,50	0,040	0,15÷0,35	15,5÷17,5	Mo = 0,20÷0,60
1.4122	X39CrMo17-1	1.4122	-	4122-434-09-I	0,33÷0,45	1,00	1,50	0,040	0,030	15,5÷17,5	Ni = ≤ 1,00 Mo = 0,80÷1,30
431	X17CrNi16-2	1.4057	431 S43100	4057-431-00-X	0,12÷0,22	1,00	1,50	0,040	0,030	15,0÷17,0	Ni = 1,50÷2,50
420C F	X46CrS13	1.4418	-	4418-431-77-E	0,33÷0,45	1,00	2,0	0,040	0,15÷0,35	12,5-14,0	-
1.4112	X90CrMoV18	1.4057	431 S43100	4057-431-00-X	0,85÷0,95	1,00	1,00	0,040	0,030	17,0÷19,0	Mo = 0,90÷1,30 V = 0,07÷0,12
1.4418	X4CrNiMo16-5-1	1.4418	-	4418-431-77-E	0,06	0,70	1,50	0,040	0,015	15,0-17,0	Mo=0,80÷1,50 Ni = 4,0÷6,0 N= >0,02

PRECIPITATION HARDENING STAINLESS STEELS BARS

Steels for surface hardening by induction

Precipitation hardening steels can reach very high performances of strength and hardness. Alloy elements such as Al, Ti, Nb, Mo and Cu produce, during ageing, precipitates able to raise the mechanical properties of these steels.

Based on chemical balance and following heat treatments, steel can achieve an austenitic, martensitic or austenitic-ferritic structure. These steels are suitable for applications where a combination of strength, corrosion resistance and mild toughness is required. Typical fields of applications are Oil&Gas, nuclear power generation and chemical plants.

	EN 10088-3: 2014 EN 10263-5: 2017	N°	AISI-UNS	ISO number	C (max)	Si (max)	Mn (max)	P (max)	S (max)	Nb	Cr	Mo	Ni	Cu
17-4PH	X5CrNiCuNb16-4			4542-174-00-I	0,07	0,70	1,50	0,040	0,030	5xC=0,45	15,0÷17,0	0,60	3,0÷5,0	3,0÷5,0
631M	X7CrNiAl17-7			4568-177-00-I	0,12÷0,22	1,00	1,50	0,040	0,015	-	15,0÷17,0	-	1,50÷2,50	-



SOFT MAGNETIC FERRITIC STEELS



The chemical analysis and production cycles of this ferritic stainless steel family make possible to obtain materials with excellent magnetic characteristics (high magnetic permeability, low coercive force). Thanks to Rodacciai specific chemical analysis, these steels have also good

corrosion resistance combined with high machinability.

The special magnetic properties of these grades make them suitable for applications where a rapid magnetisation and demagnetisation of components is required, e.g. insolenoid valves.

PRODUCTION RANGE AND EXECUTIONS

Stainless steel solenoid valves are ideal for being used in environments where corrosion resistance is required.

Ferritic stainless steels for solenoid applications must provide the component manufacturer with the following main characteristics:

- High magnetic response in the relevant hysteresis cycle;
- Suitable corrosion resistance depending on the operating environment;
- High performance in machining.

ROUND BARS

Possible solutions:

- 1) In the annealed+drawn condition (with magnetic annealing to be performed on machined parts)
- 2) In the annealed+drawn condition, magnetically annealed, ground

Range: 7,50 mm - 25,40 mm

Different sizes of magnetically annealed drawn round, hexagons and squares options.

SOFT MAGNETIC FERRITIC STEELS APPLICATIONS



HYDRAULIC
& FLUID



WIND
ENERGY



MEDICAL
PHARMA



SOLENOID
VALVES



AUTOMOTIVE



OIL & GAS



FOOD &
BEVERAGE

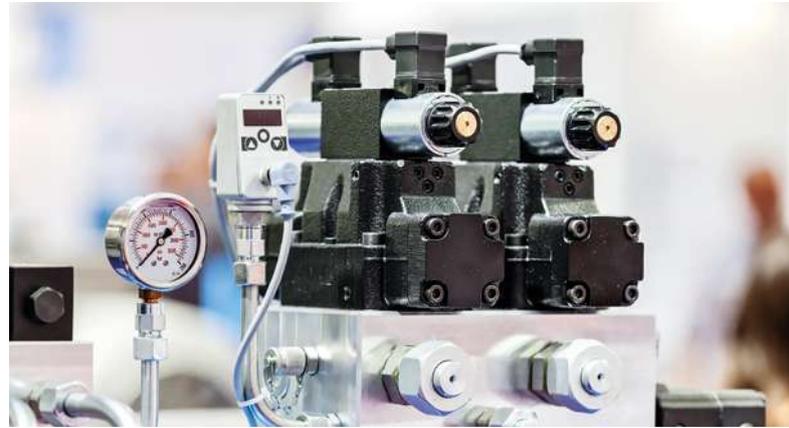


CHEMICAL
INDUSTRY

There are a lot of applications, for example: injectors, irrigation valves, valves for coffee machines, steam systems (boilers), medical, professional cleaning, sanitary applications, beverage dispensing machines, filtration systems and valves for the industrial sector.

Rodacciai HMP range of products covers all the needs required by manufacturers of solenoid valves and solenoid injectors.

That is possible thanks to different steel chemistry formulations that optimise the required performance parameters.



1.4105 HMP

CHEMICAL COMPOSITION (CAST ANALYSIS) (%)

	Grade	Standard	N°	AISI-UNS	C (max)	Si	Mn (max)	P (max)	S	Cr	Mo	Ni (max)	N (max)
1.4105 HMP	X6CrMoS17	EN 10088-3: 2014	1.4105	Alloy 2	0,030	1,20÷1,50	0,80	0,030	0,25÷0,35	17,0÷18,0	0,20÷0,50	0,50	0,04

TYPICAL MECHANICAL PROPERTIES

Hardness HR B	R _{p 0.2} (MPa)	R _m (MPa)	A (%)	Z (%)
80÷90	300 - 450	450 - 550	Min 25	Min 40

MAGNETIC AND ELECTRICAL PROPERTIES

Magnetic Permeability (μ)	Coercive Field (HC)	Residual Induction (Br)	Saturation Induction (Bs)
Min 1400	Max 200 A/m	Max 0.85 T	Typically about 1,5 T
Typical Magnetic Permeability			

1.4106 HMP

CHEMICAL COMPOSITION (CAST ANALYSIS) (%)

	Grade	Standard	N°	AISI-UNS	C (max)	Si	Mn (max)	P (max)	S	Cr	Mo	Ni (max)	N (max)
1.4106 HMP	X2CrMoSiS18-2-1	-	1.4106	(Alloy 2+Mo)	0,025	1,20÷1,50	0,60	0,030	0,25÷0,35	17,80÷18,80	1,50÷2,00	0,40	0,04

TYPICAL MECHANICAL PROPERTIES

Hardness HR B	R _{p 0.2} (MPa)	R _m (MPa)	A (%)
80÷90	300 - 450	400÷550	Min 25

MAGNETIC AND ELECTRICAL PROPERTIES

Magnetic Permeability (μ)	Coercive Field (HC)	Residual Induction (Br)	Saturation Induction (Bs)
Min 1300	Max 200 A/m	Max 0.80 T	Typically about 1.6 T
Typical Magnetic Permeability			

1.4114 HMP

CHEMICAL COMPOSITION (CAST ANALYSIS) (%)

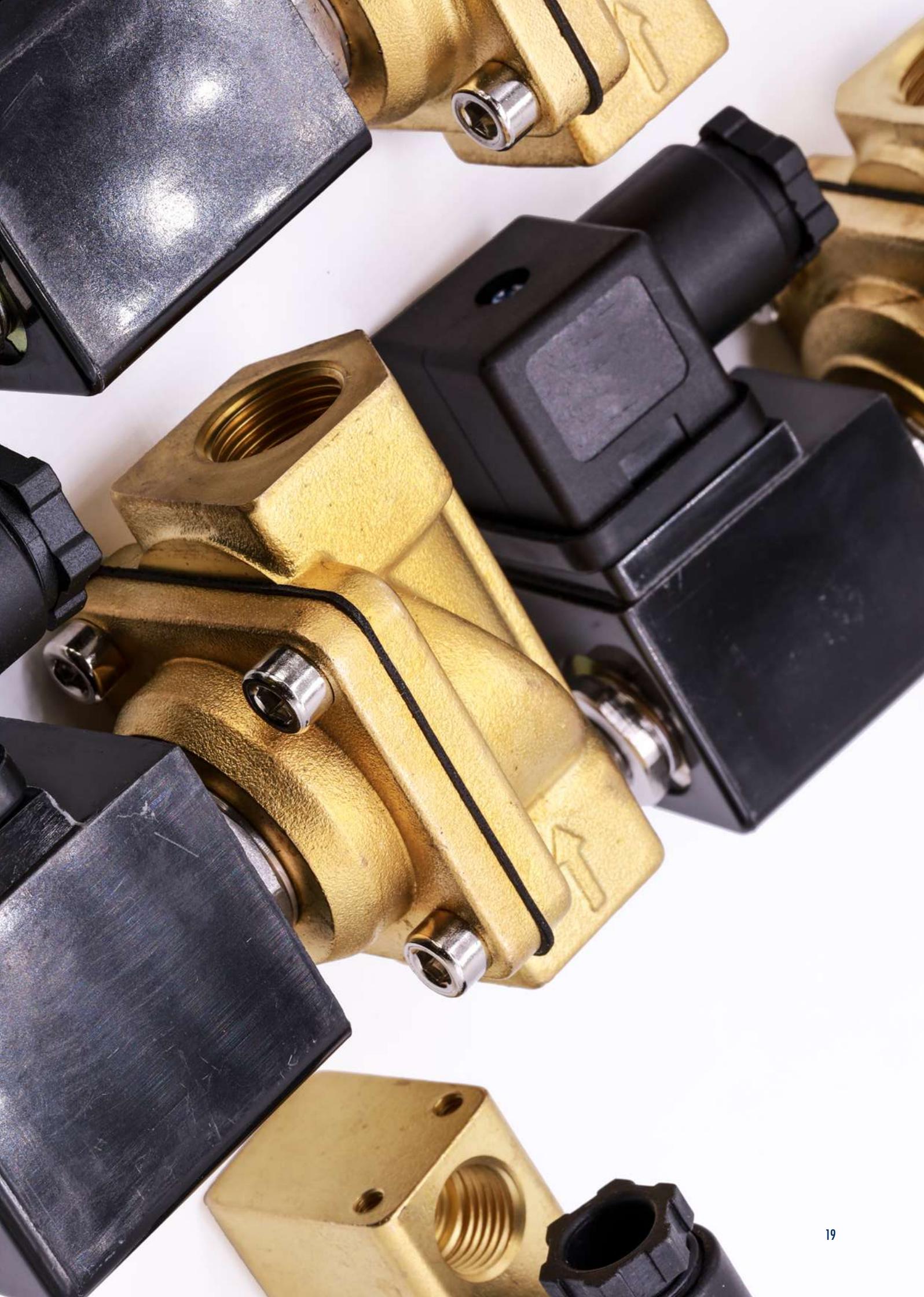
	Grade	Standard	N°	AISI-UNS	C (max)	Si	Mn (max)	P (max)	S	Cr	Mo	Ni (max)
1.4106 HMP	X2CrMoSiS18-2-1	-	1.4106	(Alloy 2+Mo)	0,025	1,20÷1,50	0,60	0,030	0,25÷0,35	17,80÷18,80	1,50÷2,00	0,40

TYPICAL MECHANICAL PROPERTIES

Hardness HR B	R _{p 0.2} (MPa)	R _m (MPa)	A (%)
-	240	430÷630	14

ELECTRICAL PROPERTIES

Electrical Resistivity 20°C
0,60 Ω mm ² /m



COLD DRAWN WIRE



The cold drawn stainless steel wire production is an historical division of Rodasteel group, which has been subsequently extended to reach the current annual production capacity of 75.000 tonnes.

The ALL IN HOUSE strategy allows to control each step of the production cycle guaranteeing a high quality level and studying solutions based on customer's needs. The surface treatments, performed internally, improve the finishing of the

product, making it cleaner and ready for further production steps.

The heat treatments allow to balance the structure of the wire rods and to reduce internal tensions, increasing the deformability of the product. The heat treatments made in house are: Quenching and Tempering (+QT), Soft annealing (+A), Solution annealing (+AT). It is possible to customize the surface of the wire. Rodacciai produces and sells cold drawn wire for all the main market applications.

PRODUCTION RANGE AND EXECUTIONS

	Condition	Profile	Range (mm)	Surface finishing	Tolerances
Coil	Cold-drawn	Round Hexagonal Square Special	1÷22 3÷12 4÷12 Rated on request	Bright Coated	ISA h9-h10-h11 EN 10218-2 T1-T2-T3-T4-T5

Different tolerances can be evaluated.

COLD DRAWN WIRE APPLICATIONS



AUTOMOTIVE



FASTENERS



FOOD &
BEVERAGE



CHEMICAL
INDUSTRY

AUSTENITIC STAINLESS STEEL WIRE

There are several markets for this kind of material - such as automotive, food & beverage, chemical industry and cold forging for screws. Some other materials allow to achieve high mechanical properties and they are suitable for springs and spokes productions.

FERRITIC STAINLESS STEEL WIRE

These qualities are ideal for the production of scourers for cleaning and components for catalytic converters for cars.

MARTENSITIC STAINLESS STEEL WIRE

The series 420, thanks to cold forging process followed by quench and tempering phase, is used in screw production.

STAINLESS STEEL WIRE HEAT-RESISTANT

The most common application is for carpet in the heat treatments furnaces and in the food & beverage machineries.

DUPLEX (AUSTENITIC-FERRITIC) STAINLESS STEEL

Duplex stainless steel wire finds applications in various industries, including oil and gas, chemical processing, desalination plants, pulp and paper, and offshore structures.

Typical uses include wire ropes, springs, fasteners, welding consumables and other components that require a combination of strength, corrosion resistance and durability.

PRECIPITATION HARDENING STAINLESS STEELS WIRE

Stainless steel precipitation hardening wire is commonly used in applications that require high strength, corrosion resistance, and good mechanical properties.

It finds applications in industries such as aerospace, oil and gas, automotive, and medical.

Some common uses of precipitation hardening wire include springs, fasteners, shafts, valves, and components for high-stress environments.



AUSTENITIC STAINLESS STEEL WIRE

300 SERIES

Corrosion resistant, non-magnetic steels

Austenitic stainless steel are characterised by high percentage of chromium and nickel that allows a good resistance to the corrosion. This property can be even increased by adding other chemical elements such as molybdenum, titanium and niobium. There is also the possibility to use the Plus series that has a good workability thanks to sulphur.

Some examples are 304 - 1.4301 - 304L - 1.4307 - 316 - 1.4401 - 316L - 1.4404 - 321 - 1.4541 - 316Ti - 1.4571, used in several sectors as fasteners, food & beverage and automotive.

Another material of this steel family is AISI 302, which is characterized by good cold forming properties that allows high mechanical characteristics. For this reason it is perfect for the production of springs and spokes. Austenitic stainless steel wire can be used also for application as fasteners and cold heading wires. An examples are 304Cu and 316Cu

	EN 10088-3: 2014 EN 10263-5: 2017	N°	AISI-UNS	ISO number	C (max)	Si (max)	Mn (max)	P (max)	S (max)	N (max)	Cr	Ni	Other elements
204CU	X8CrMnCuN17-8-3	-	-	4597-204-761	0,10	1,00	6,5÷9,0	0,040	0,030	0,10÷0,25	15,5÷17,5	1,5÷3,5	Cu = 2,00÷3,50 Mo max = 1,00
302	X10CrNi18-8	1.4310	302 S30200	4310-301-001	0,05÷0,15	2,00	2,00	0,045	0,015	0,10	16,0÷19,0	6,0÷9,5	Mo max = 0,80
303PLUS	X8CrNiS18-9	1.4305	303 S30300	4305-303-001	0,10	1,00	2,00	0,045	0,15÷0,35	0,10	17,0÷19,0	8,0÷10,0	Cu max = 1,00
GVR	X6CrNiCuS18-9-2	1.4570	303+Cu S30331	4570-303-31-1	0,08	1,00	2,00	0,045	0,15÷0,35	0,10	17,0÷19,0	8,0÷10,0	Mo max = 0,60 Cu = 1,40÷1,80
304	X5CrNi18-10	1.4301	304 S30400	4301-304-001	0,07	1,00	2,00	0,045	0,015	0,10	17,5÷19,5	8,0÷10,5	-
304HF	X2CrNi18-9	1.4307	304L S30403	4307-304-03-1	0,07	1,00	2,00	0,045	0,020÷0,030	0,10	17,5÷19,5	8,0÷10,5	-
304PLUS	X2CrNi18-9	1.4307	304L S30403	4307-304-03-1	0,030	1,00	2,00	0,045	0,020÷0,030	0,10	17,5÷19,5	8,0÷10,5	-
304ST	X2CrNi19-11	1.4306	(321 S32100)	4541-321-001	0,030	1,00	2,00	0,045	0,015	0,10	18,0÷20,0	10,0÷12,0	-
304CU	X3CrNiCu18-9-4	1.4567	304L S30403	4306-304-03-1	0,04	1,00	2,00	0,045	0,015	0,10	17,0÷19,0	8,5÷10,5	Cu = 3,0÷4,0
316	X5CrNiMo17-12-2	1.4401	302HQ S30430	4567-304-30-1	0,07	1,00	2,00	0,045	0,015	0,10	16,5÷18,5	10,0÷13,0	Mo = 2,00÷2,50
316TI	X6CrNiMoTi17-12-2	1.4571	316 S31600	4401-316-001	0,030	1,00	2,00	0,045	0,015	0,10	16,5÷18,5	10,0÷13,0	Mo = 2,00÷2,50 Ti = 5x%C÷0,70
316L	X2CrNiMo17-12-2	1.4404	316L S31603	4404-316-03-1	0,030	1,00	2,00	0,045	0,015	0,10	16,5÷18,5	10,0÷13,0	Mo = 2,00÷2,50
316CU	X3CrNiCuMo17-11-3-2	1.4578	(316Ti S31635)	4571-316-35-1	0,04	1,00	2,00	0,045	0,015	0,10	16,5÷17,5	10,0÷11,0	Mo = 2,00÷2,50 Cu = 3,0÷3,5
321	X6CrNiTi18-10	1.4541	316L S31603	4432-316-03-1	0,08	1,00	2,00	0,045	0,020÷0,030	-	17,0÷19,0	9,0÷12,0	Ti = 5x%C÷0,70
1.4435	X2CrNiMo18-14-3	1.4435	316L S31603	4435-316-91-1	0,030	1,00	2,00	0,045	0,030	0,10	17,0÷19,0	12,5÷15,0	Mo = 2,50÷3,00
347H	X6CrNiNb18-10	1.4550	347H 347S31	-	0,04÷0,08	1,00	2,00	0,045	0,015	-	17,0÷19,0	9,0÷12,0	Nb = 10x%C÷1,00

* Typical analysis

STAINLESS STEEL WIRE HEAT-RESISTANT

300 SERIES

Steels resistant to corrosion and high temperatures

The specific needs of parts that operate at very high temperatures have led to create stainless steels able to withstand these very particular conditions: this is, for example, the case of steels designed to be used into heat treatment ovens or as resistors of radiating elements. Thanks to the addition of chromium and nickel in high quantities and to a balanced analysis, the steels in this category are particularly suitable for retaining good mechanical characteristics at high temperature; they can therefore remain in service for a long time in environments at high temperature and with chemical aggressiveness.

	EN 10088-1:2014 EN 10095: 1999	N°	AISI-UNS	C (max)	Si (max)	Mn (max)	P (max)	S (max)	N (max)	Cr	Ni
310	X8CrNi25-21	1.4845	(310S S31008)	0,10	1,50	2,00	0,045	0,015	0,11	24,0÷26,0	19,0÷22,0
314	X15CrNiSi25-21	1.4887	330Nb	0,20	1,50÷2,50	2,00	0,045	0,015	0,11	24,0÷26,0	19,0÷22,0
1.4828	X15CrNiSi20-12	1.4828	(309 - S30900)	0,20	1,50-2,50	2,00	0,045	0,015	0,11	19,0-21,0	11,0-13,0

FERRITIC STAINLESS STEEL WIRE

400 SERIES

Corrosion-resistant, non-hardenable steels

AISI 430 – 1.4016 is one of the most common qualities of ferritic stainless steel. It is typically used in production of meshes, in the clean industry and in the automotive sector.

Another application of this steel family is for the production of screws, in this case the recommended quality is AISI 434. For these materials the resistance of the corrosion is lower than austenitic stainless steels.

	EN 10088-3: 2014 EN 10263-5: 2017	N°	AISI-UNS	ISO number	C (max)	Si (max)	Mn (max)	P (max)	S (max)	Cr	Mo	Other elements
430	X6Cr17	1.4016	430 S43000	4016-430-001	0,08	1,00	1,00	0,040	0,015	16,0÷18,0	-	-
430NB	X3CrNb17	1.4511	-	4511-430-711	0,05	1,00	1,00	0,040	0,015	16,0÷18,0	-	Nb=12xC÷1,0
1.4105	X6CrMoS17	1.4105	430F S43020	-	0,08	1,50	1,50	0,040	0,15÷0,35	16,0÷18,0	0,20÷0,60	-
434	X6CrMo17-1	1.4113	434 S43400	4113-434-001	0,08	1,00	1,00	0,040	0,030	16,0÷18,0	0,90÷1,40	-

DUPLEX STAINLESS STEEL WIRE

AUSTENO-FERRITIC

Duplex (austenitic-ferritic) stainless steel, suitable for aggressive environments

Duplex stainless steels (Austeno-ferritic) have two-phase microstructure containing ferrite and austenite. Despite lower nickel content, they show excellent corrosion resistance and they can achieve high mechanical properties through cold drawing. These steels are suitable for marine and off-shore oil exploration. They are magnetic, can be welded but can not be heat treated and quenched. Duplex steels are still undergoing research and development to fully explore new uses and applications.

	EN 10088-3: 2014 EN 10263-5: 2017	N°	AISI-UNS	ISO number	C (max)	Si (max)	Mn (max)	P (max)	S (max)	Cr	Cu	Mo	N	Ni
2304	X2CrNiN23-4	1.4362	(2304 S32304)	4362-323-041	0,03	1,00	2,00	0,035	0,015	22,0÷24,5	0,01÷0,60	0,01÷0,60	0,05÷0,20	3,5÷5,5
AISI 329	X3CrNiMoN27-5-2	1.4460	(329 S32900)	4460-312-001	0,05	1,00	2,00	0,035	0,030	25,0÷28,0	-	1,30÷2,00	0,05÷0,20	4,5÷6,5
2205	X2CrNiMoN22-5-3	1.4462	2205 S31803	4462-318-031g	0,03	1,00	2,00	0,035	0,015	21,0÷23,0	-	2,5÷3,5	0,10÷0,22	4,5÷6,5
2101	X2CrMnNiN21-5-1	1.4162	(2101 S32101)	4162-321-01-Eg	0,04	1,00	4,0÷6,0	0,040	0,015	21,0÷22,0	0,10÷0,80	0,10÷0,80	0,20÷0,25	1,35÷1,90

MARTENSITIC STAINLESS STEEL WIRE 400 SERIES

Corrosion-resistant, hardenable steels

The main feature of this kind of steel is their suitability to heat treatment (for example the quenching and tempering). These steels can be used in many sectors thanks to the higher mechanical characteristics that they can reach. The most known grade is AISI 430F – 1.4104, which is used in oil & gas industry, automotive sector and for the construction of pumps and valves.

	EN 10088-3: 2014 EN 10263-5: 2017	N°	AISI-UNS	ISO number	C	Si (max)	Mn (max)	P (max)	S (max)	Cr	Other elements
410	X12Cr13	1.4006	410 S41000	4006-410-001	0,08÷0,15	1,00	1,50	0,040	0,030	11,5÷13,5	Ni = ≤ 0,75
416	X12CrS13	1.4005	416 S41600	4005-416-001	0,06÷0,15	1,00	1,50	0,040	0,15÷0,35	12,0÷14,0	Mo = ≤ 0,60
420A	X20Cr13	1.4021	420 S42000	4021-420-001	0,16÷0,25	1,00	1,50	0,040	0,015	12,0÷14,0	-
420B	X30Cr13	1.4028	420 S42000	4028-420-001	0,26÷0,35	1,00	1,50	0,040	0,030	12,0÷14,0	-
420C	X39Cr13	1.4031	420 S42000	-	0,36÷0,42	1,00	1,00	0,040	0,015	12,5÷14,5	-
420C1	X46Cr13	1.4034	420 S42000	-	0,43÷0,50	1,00	1,00	0,040	0,015	12,5÷14,5	-
430F	X14CrMoS17	1.4104	430F S43020	4019-430-201	0,10÷0,17	1,00	1,50	0,040	0,15÷0,35	15,5÷17,5	Mo = 0,20÷0,60
1.4122	X39CrMo17-1	1.4122	-	4122-434-091	0,33÷0,45	1,00	1,50	0,040	0,015	15,5÷17,5	Ni = 1,00 Mo = 0,80÷1,30
431	X17CrNi16-2	1.4057	431 S43100	4057-431-00-X	0,12÷0,22	1,00	1,50	0,040	0,030	15,0÷17,0	Ni = 1,50÷2,50
420C F	X46CrS13	1.4418	-	4418-431-77-E	0,33÷0,45	1,00	2,0	0,040	0,15÷0,35	12,5-14,0	-
1.4112	X90CrMoV18	1.4057	431 S43100	4057-431-00-X	0,85÷0,95	1,00	1,00	0,040	0,030	17,0÷19,0	Mo = 0,90÷1,30 V = 0,07÷0,12
1.4418	X4CrNiMo16-5-1	1.4418	-	4418-431-77-E	0,06	0,70	1,50	0,040	0,015	15,0-17,0	Mo=0,80÷1,50 Ni = 4,0÷6,0 N= >0,02

PRECIPITATION HARDENING STAINLESS STEELS WIRE

Stainless steel precipitation hardening, unparalleled strength and durability

Stainless steel precipitation hardening wire, also known as PH stainless steel wire, is a type of stainless steel wire that undergoes a process called precipitation hardening to achieve improved strength and hardness. The most common type of stainless steel used for precipitation hardening wire is known as PH 17-4 stainless steel, which belongs to the 17-4 PH stainless steel family. It contains approximately 17% chromium and 4% nickel, along with other alloy elements such as copper and niobium. The addition of these elements helps to promote the precipitation of fine particles during the heat treatment process. Stainless steel precipitation hardening wire is commonly used in applications that require high strength, corrosion resistance and good mechanical properties. It finds applications in industries such as aerospace, oil & gas, automotive and medical. Some common uses of precipitation hardening wire include springs, fasteners, shafts, valves and components for high-stress environments.

	EN 10088-3: 2014 EN 10263-5: 2017	N°	AISI-UNS	ISO number	C (max)	Si (max)	Mn (max)	P (max)	S (max)	Nb	Cr	Mo	Ni	Cu
17-4PH	X5CrNiCuNb16-4			4542-174-001	0,07	0,70	1,50	0,040	0,030	5xC=0,45	≤ 0,030	0,60	≤ 0,030	3,0÷5,0
631M	X7CrNiAl17-7			4568-177-001	0,12÷0,22	1,00	1,50	0,040	0,015	-	15,0÷17,0	-	1,50÷2,50	-

STANDARD WIRE PACKAGING

Here below our standard options for wire packaging:



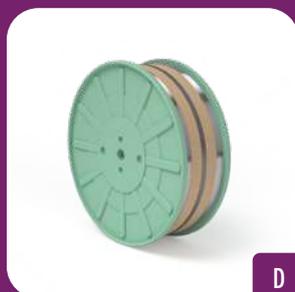
A



B



C



D

There is always the possibility to customise other options according to the requirements of the customer.

DIVISION FOR DIAMETERS:

FROM Ø 1,2 UP TO Ø 9 >> possible solutions

- wooden or metallic spools 250kg - 4,00 mm max
- former 300 - 600 kg max
- drum 180 liters - Ø 1,80 mm max
- drum 280 liters - from 2,00 to 4,00 mm
- coils on wooden pallets 500kg - 1000kg - from 1,20 to 9,00

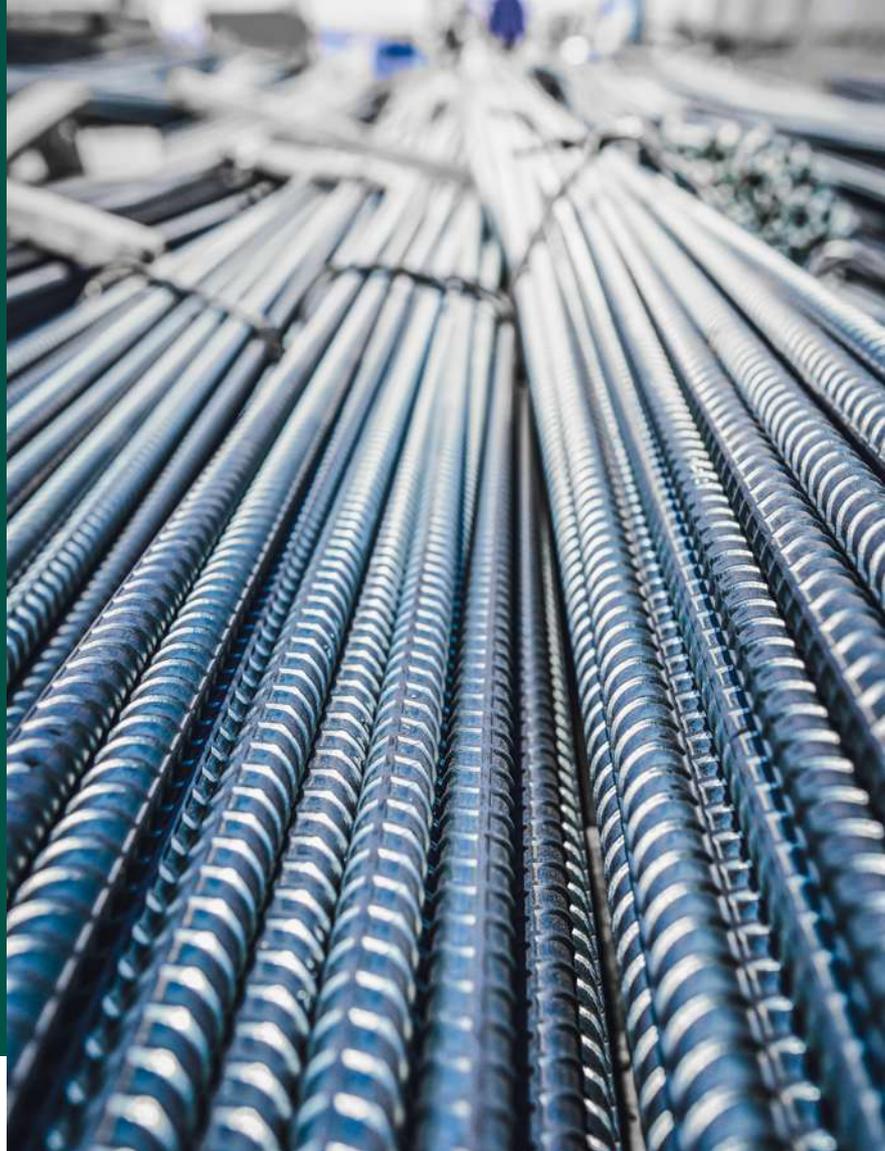
FROM Ø 9 UP TO Ø 15 >> possible solutions

- coils on wooden pallets 500kg - 1000kg
- coils 500kg - 1000kg

FROM Ø 15 UP TO Ø 34

coils on wooden pallets 1000kg - 2000kg

STAINLESS STEEL REINFORCING BARS FOR CONCRETE



Rodinox® is a complete range of reinforcing products for concrete, in bars and rolls, available in all the most important stainless steel types.

In situations where the environment is aggressive, these bars are the perfect solution to avoid corrosion.

The use of Rodinox® enhances durability on concrete structures compared with usual carbon rebar. Rodinox® can be processed in the same way as carbon steel bars, with the only caution to avoid contamination of stainless surface by using accurately with clean machines.



PRODUCTION RANGE AND EXECUTIONS

THE SIZE RANGE RODINOX® It is available in rolls in the range from 6 to 16 mm and in bars in the range from 6 to 40 mm.

RODINOX® GRADES In order to meet the various needs, Rodinox® is manufactured in the following types:



GRADE	TYPE	REFERENCE STEEL	
RODINOX® R1	austenitic in Cr - Ni	304L / 304LN	1.4307 / 1.4315
RODINOX® R2	austenitic in Cr - Ni - Mo	316L / 316LN	1.4404 / 1.4406
RODINOX® R3	austenitic in Cr - Ni - Mo	316HMo / 316LNMo	1.4436 / 1.4429
RODINOX® R4	duplex	2304	1.4362
RODINOX® R5	duplex	2205	1.4462

APPLICATIONS OF RODINOX BARS



HIGH TEMPERATURE



SEISMIC ZONES



LOW MAGNETIC PERMEABILITY



LOW TEMPERATURE



MARINE ENVIRONMENT

MARINE ENVIRONMENT AND SALT

Structures exposed to marine environment are at risk: above all, the stainless steel reinforcing bars must be used on the parts close to the surface when the structure is alternatively wet and dry.

The concrete cover can be reduced in comparison with the usual cover, necessary when chlorides are present in the environment.

LOW TEMPERATURE HIGH MOUNTAINS AND DE-ICING SALT

Rodinox® bars can be used in high mountains roads and constructions, because low-temperature toughness eliminates the risk of brittle structures even when the climate is rigid. For the same reason, its use is recommended for cryogenic applications.

Rodinox® is resistant to accurately salt, so it can be applied also where de-icing salt must be used.

LOW MAGNETIC PERMEABILITY

Rodinox® is suitable for use when very low magnetic permeability is required: for example it can be provided in structures where special electronic equipment are located, but also in other particular situations such as operating rooms of the hospitals, where there are magnetic resonance equipment or the control towers of the airports.

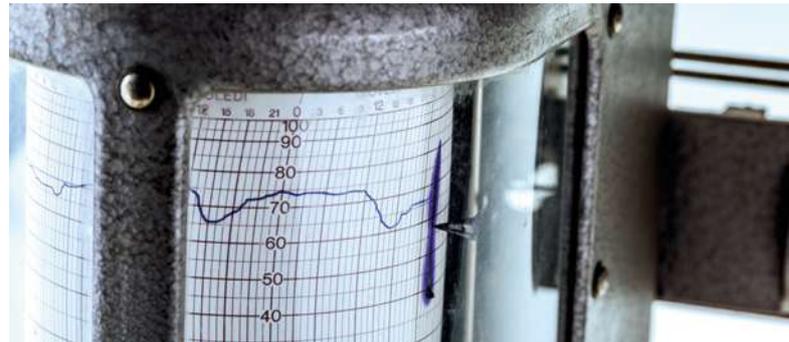
SEISMIC ZONES

Thanks to its high plasticity and fatigue limit, all Rodinox® stainless steel reinforcing bars last longer than the common steel rebar, showing also a lower brittleness: for these reasons its use is recommended in seismic areas, to reduce the risk of collapse of buildings and skyscrapers in case of earthquakes.

HIGH TEMPERATURE RESISTANCE

Rodinox® is not only resistant to low and very low temperatures: it shows a very good performance also at high and very high temperatures.

A feature that makes it suitable for a long resistance also in case of fire, giving the time for limiting the damage to the buildings and making them safer for people.



LIFE CYCLE COST: DURABILITY THROUGH YEARS



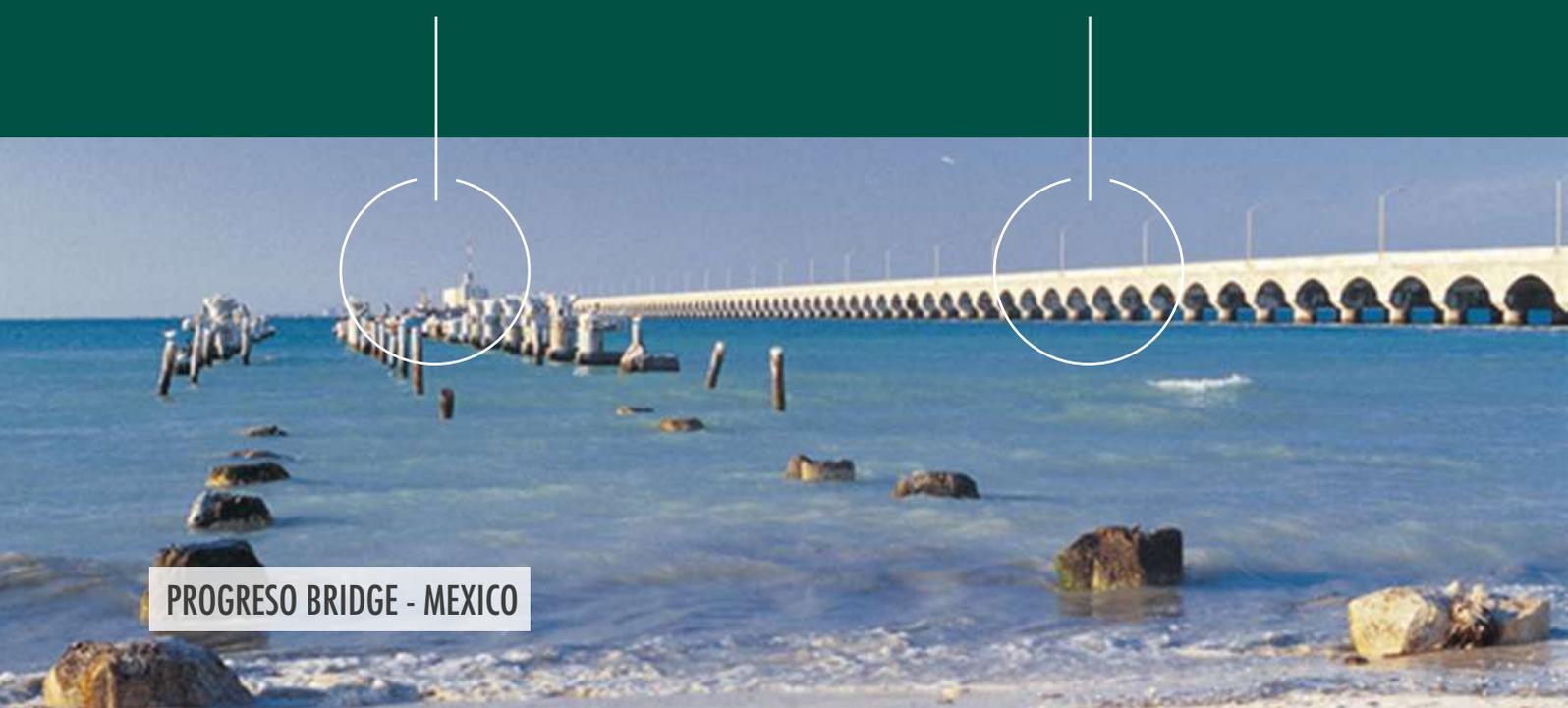
The Life Cycle Cost of structures and buildings can be greatly reduced by using stainless steel reinforcing bars in appropriate positions. The best deal is to use Rodinox® bars in contact with water and salt, while leaving the carbon steel rebars for the parts where the risk of chloride contamination tends to zero, such as the inner parts.

Using this mix of materials the initial investment may increase by 3%, but the cost of maintenance during the year can be reduced. There is an increasing demand for artifacts that have to last longer, even hundreds of years, requiring a very low maintenance: the only possible approach to these kind of requests is the use of Rodinox®, so that the costs due to the maintenance of reinforcing bars is practically eliminated since the beginning.



A 30 YEARS OLD BRIDGE
MADE WITH ONLY CARBON STEEL

A 60 YEARS OLD BRIDGE
MADE WITH STAINLESS STEEL



PROGRESO BRIDGE - MEXICO

INITIAL COST

20% RODINOX® + 80% CARBON STEEL



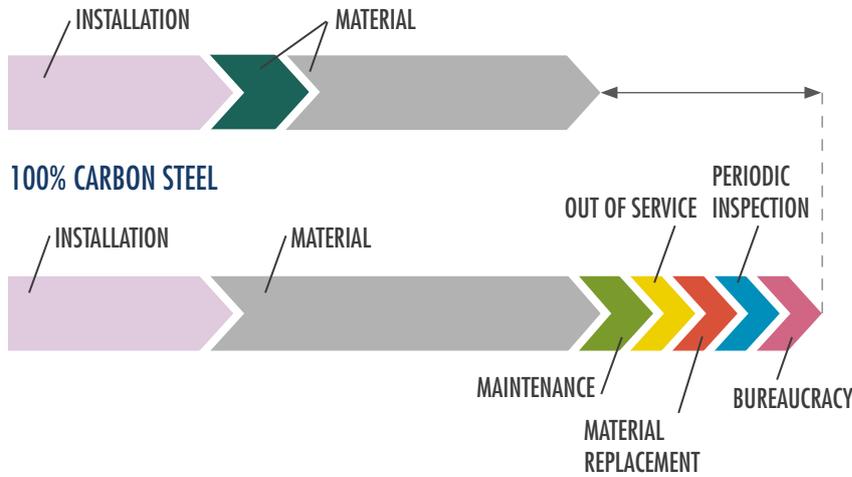
100% CARBON STEEL



AVERAGE INCREASE OF THE
CONSTRUCTION'S COST
BY USING RODINOX
INSTEAD OF CARBON STEEL

90 YEARS COST OF THE ARTIFACT (BRIDGE)

20% RODINOX® + 80% CARBON STEEL



REDUCTION OF THE COST OF THE ARTIFACT IN 90 YEARS USING RODINOX

LIFE OF SERVICE

RODINOX®



CARBON STEEL



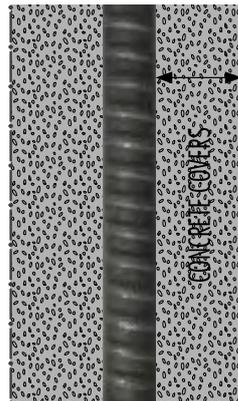
INCREASES THE LIFE OF SERVICE, I.E. THE YEARS WITHIN THE EXTRAORDINARY MAINTENANCE IS NOT REQUIRED

CONCRETE REDUCTION THANKS TO RODINOX®

RODINOX®



CARBON STEEL



IT ALLOWS THE **REDUCTION OF 50% CONCRETE COVERS**

WITHOUT RODINOX®

STAINLESS STEEL REINFORCING BARS

Rodinox® round with improved adherence for the reinforcement of concrete

Rodinox® is the answer to concrete reinforcement problems when high durability is required under severe climatic and environmental conditions.

In these situations, in fact, concrete reinforcement with carbon steel is not sufficient and it is therefore opportune to use stainless steel, whose characteristics are optimally exploited in the construction field as:

- it is suitable for use in seismic areas thanks to high plasticity, a high fatigue limit and the absence of fragility;
- it resists to low temperatures without brittleness phenomena;
- it resists to high temperatures, including flame and fires;
- it is suitable for use in the hospitals and in the airport control towers thanks to a very low magnetic permeability so that it does not alter the operation of sensitive electronic equipment.

CHEMICAL COMPOSITION

The average chemical composition of Rodinox® is as follows:

GRADE	C	Mn	Si	S	P	Cr	Ni	Mo	N	Cu
RODINOX® R1	0,02	1,6	0,5	<0,010	0,04	18,5	8,1	-	0,20	-
RODINOX® R2	0,02	1,6	0,5	<0,010	0,04	18,0	10,1	2,1	0,20	-
RODINOX® R3	0,02	1,6	0,5	<0,010	0,04	17,1	11,1	2,6	0,20	-
RODINOX® R4	0,02	0,8	0,5	<0,010	0,04	23,2	4,1	0,2	0,10	0,30
RODINOX® R5	0,02	0,8	0,5	<0,010	0,04	22,8	5,2	3,1	0,20	-

* conforms to BS 6744 standard

THE SIZE RANGE RODINOX®

GRADE	Ministerial Decree 14.01.2008 Technical Standards for Construction class B450C		BS 6744: 2016	
	Rolls	Bars	Rolls	Bars
RODINOX® R1	6 - 14 mm	6 - 32 mm	6 - 16 mm	6 - 32 mm
RODINOX® R2	6 - 14 mm	6 - 32 mm	-	-
RODINOX® R3	6 - 14 mm	6 - 32 mm	6 - 16 mm	6 - 32 mm
RODINOX® R4	6 - 32 mm		6 - 16 mm	6 - 40 mm
RODINOX® R5	-		6 - 32 mm	

* conforms to BS 6744 standard

RODINOX® REFERENCE STANDARDS

Mass per linear meter as a function of the type of steel (units kg/m)

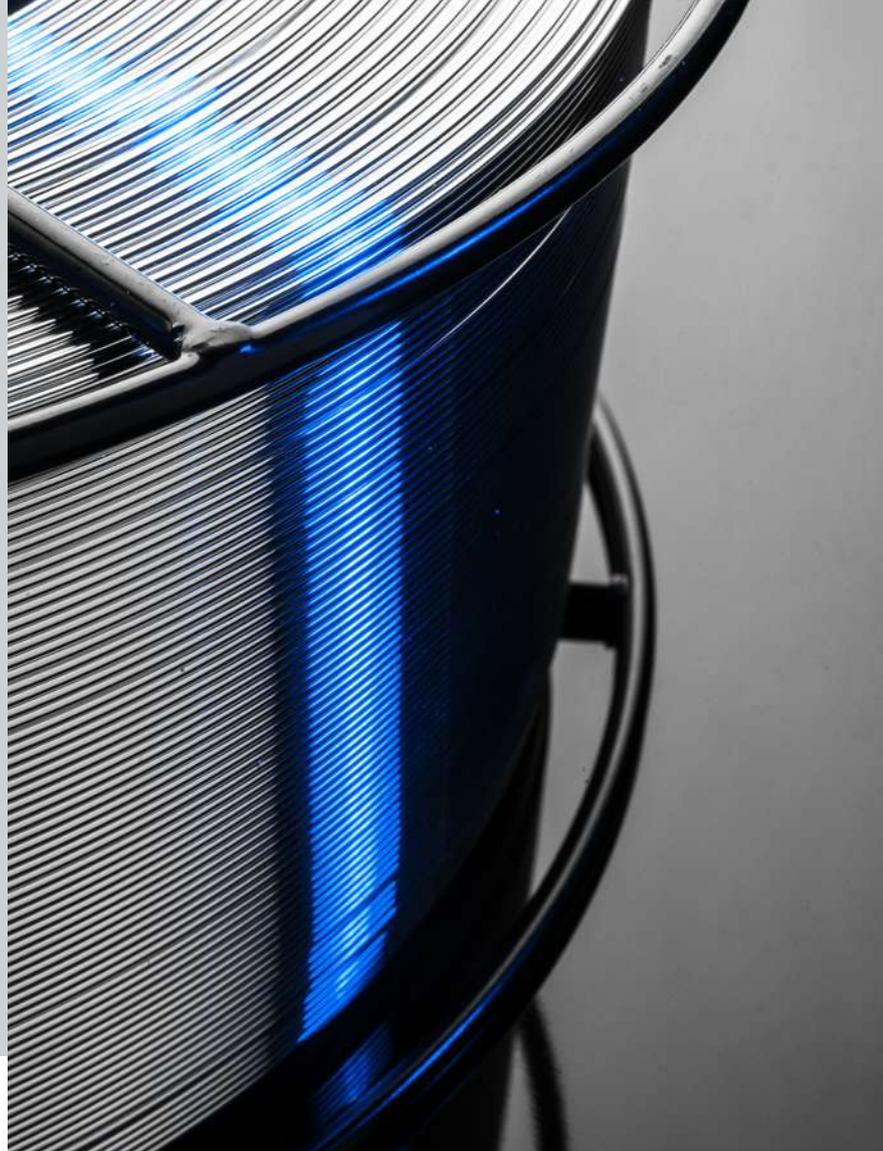
GRADE	Ø nom. mm	5	6	7	8	10	12	14	16	18	20	22	24	25	26	32	40
	section mm ²	19,6	28,3	38,5	50,3	78,5	113,1	153,9	201,1	254,5	314,2	380,2	452,4	490,9	531,0	804,2	1256,6
RODINOX® R1	0,155	0,224	0,304	0,397	0,620	0,893	1,216	1,589	2,011	2,482	3,003	3,574	3,878	4,195	6,353	9,927	
RODINOX® R2	0,157	0,226	0,308	0,402	0,628	0,905	1,231	1,609	2,036	2,514	3,041	3,620	3,927	4,248	6,434	10,053	
RODINOX® R3	0,157	0,226	0,308	0,402	0,628	0,905	1,231	1,609	2,036	2,514	3,041	3,620	3,927	4,248	6,434	10,053	
RODINOX® R4*	0,153	0,221	0,300	0,392	0,612	0,882	1,200	1,569	1,985	2,451	2,965	3,529	3,829	4,142	6,266	9,790	
RODINOX® R5*	0,153	0,221	0,300	0,392	0,612	0,882	1,200	1,569	1,985	2,451	2,965	3,529	3,829	4,142	6,266	9,790	

* conforms to BS 6744 standard



 ISO 9001 1242	 UKAS MANAGEMENT SYSTEMS 0002	
<p>Validate with the CARES Cloud App</p>		

STAINLESS STEELS FOR WELDING



Rodacciai
WELDING 



Stainless steel wire and rods of various types are used as welding filler materials for the production of electrodes, MIG, TIG and Submerged Arc welding. According to customers' requirements, it is possible to provide austenitic, martensitic, ferritic or austenitic-ferritic (duplex - super duplex) stainless steels.

The use of selected wire rods, with controlled impurity levels, guarantees an optimal weld, both from the point of view of the mechanical strength and in terms of the presence of delta ferrite, i.e corrosion resistance.

Furthermore, the chemical composition of the materials applies to all principals international standards, including the European standard EN ISO and American standard AWS.

Thanks to the quality of its stainless steel welding wire products, Rodacciai supplies all the major welding houses and electrode manufacturers all over the world.

The company offers a variety of different kind of packaging (spools and drums) and the possibility to customize each of them.

During the years Rodacciai achieved several certifications such as TÜV/CE (Europe), DB (Germany) and CWB (Canada).

Recently the stainless steel welding products have been approved and used by the major car manufacturers worldwide and in the construction of nuclear power plants.

CHEMICAL COMPOSITION (BATCH ANALYSIS) %

☐		C	Mn	Si	S	P	Cr	Ni	Mo	Cu	N	Nb	Ti
RW 307	min	-	5,00	-	-	-	17,0	7,0	-	-	-	-	-
	max	0,08	8,00	0,50	0,030	0,030	20,0	10,0	0,30	0,30	-	-	-
RW 307L	min	-	5,00	0,30	-	-	17,0	7,0	-	-	-	-	-
	max	0,05	8,00	0,70	0,030	0,030	20,0	10,0	0,30	0,30	-	-	-
RW 307SI	min	-	5,00	0,65	-	-	17,0	7,0	-	-	-	-	-
	max	0,10	8,00	1,00	0,030	0,030	20,0	10,0	0,30	0,30	-	-	-
RW 308L	min	-	1,00	-	-	-	19,5	9,0	-	-	-	-	-
	max	0,03	2,50	0,20	0,020	0,030	21,0	11,0	0,30	0,30	-	-	-
RW 308LAWS	min	-	1,00	0,30	-	-	19,5	9,0	-	-	-	-	-
	max	0,03	2,50	0,65	0,020	0,030	21,0	11,0	0,30	0,30	-	-	-
RW 19-9-L	min	-	1,00	0,30	-	-	19,5	9,0	-	-	-	-	-
	max	0,03	2,50	0,65	0,030	0,030	22,0	11,0	0,75	0,75	-	-	-
RW 308LSI	min	-	1,00	0,65	-	-	19,5	9,0	-	-	-	-	-
	max	0,03	2,50	1,00	0,020	0,030	21,0	11,0	0,30	0,30	-	-	-
RW 308H	min	0,04	1,00	0,30	-	-	19,5	9,0	-	-	-	-	-
	max	0,08	2,50	0,65	0,020	0,030	21,0	11,0	0,30	0,30	-	-	-
RW 309L	min	-	1,00	0,30	-	-	23,0	12,0	-	-	-	-	-
	max	0,03	2,50	0,65	0,020	0,030	25,0	14,0	0,30	0,30	-	-	-
RW 309SI	min	-	1,00	0,65	-	-	23,0	12,0	-	-	-	-	-
	max	0,12	2,50	1,00	0,030	0,030	25,0	14,0	0,75	0,75	-	-	-
RW 309LSI	min	-	1,00	0,65	-	-	23,0	12,0	-	-	-	-	-
	max	0,03	2,50	1,00	0,020	0,030	25,0	14,0	0,30	0,30	-	-	-
RW 309LMO	min	-	1,00	0,30	-	-	21,0	11,0	2,00	-	-	-	-
	max	0,03	2,50	0,65	0,020	0,030	25,0	15,5	3,50	0,30	-	-	-
RW 309H	min	0,04	1,00	0,30	-	-	23,0	12,0	-	-	-	-	-
	max	0,15	2,50	0,65	0,030	0,030	24,0	14,0	0,50	0,30	-	-	-
RW 310	min	0,08	1,00	0,30	-	-	25,0	20,0	-	-	-	-	-
	max	0,15	2,50	0,65	0,020	0,030	27,0	22,0	0,30	0,30	-	-	-
RW 312	min	-	1,00	0,30	-	-	28,0	8,0	-	-	-	-	-
	max	0,15	2,50	0,65	0,020	0,030	32,0	10,5	0,30	0,30	-	-	-
RW 316L	min	-	1,00	-	-	-	18,0	11,0	2,50	-	-	-	-
	max	0,03	2,50	0,20	0,020	0,030	20,0	14,0	3,00	0,30	-	-	-
RW 316LAWS	min	-	1,00	0,30	-	-	18,0	11,0	2,50	-	-	-	-
	max	0,03	2,50	0,65	0,020	0,030	20,0	14,0	3,00	0,30	-	-	-
RW 316LSI	min	-	1,00	0,65	-	-	18,0	11,0	2,50	-	-	-	-
	max	0,03	2,50	1,00	0,020	0,030	20,0	14,0	3,00	0,30	-	-	-

CHEMICAL COMPOSITION (BATCH ANALYSIS) %

☐		C	Mn	Si	S	P	Cr	Ni	Mo	Cu	N	Nb	Ti
RW 316H	min	0,04	1,00	0,30	-	-	18,0	11,0	2,00	-	-	-	-
	max	0,08	2,50	0,65	0,020	0,030	20,0	14,0	3,00	0,30	-	-	-
RW 317LAWS	min	-	1,00	0,30	-	-	18,5	13,0	3,00	-	-	-	-
	max	0,03	2,50	0,65	0,020	0,030	20,0	15,0	4,00	0,30	-	-	-
RW 318SI	min	-	1,00	0,65	-	-	18,0	11,0	2,50	-	-	10xC	-
	max	0,08	2,50	1,00	0,020	0,030	20,0	14,0	3,00	0,30	-	1,00	-
RW 347	min	-	1,00	0,30	-	-	19,0	9,0	-	-	-	10xC	-
	max	0,08	2,50	0,65	0,020	0,030	21,0	11,0	0,30	0,30	-	1,00	-
RW 347SI	min	-	1,00	0,65	-	-	19,0	9,0	-	-	-	10xC	-
	max	0,08	2,50	1,00	0,020	0,030	21,0	11,0	0,30	0,30	-	1,00	-
RW 385	min	-	1,00	-	-	-	19,5	24,0	4,20	1,20	-	-	-
	max	0,025	2,50	0,50	0,020	0,020	21,5	26,0	5,20	2,00	-	-	-
RW 2209	min	-	0,50	-	-	-	21,5	7,5	2,50	-	0,10	-	-
	max	0,03	2,00	0,90	0,020	0,030	23,5	9,5	3,50	0,30	0,20	-	-
RW 409CB	min	-	-	-	-	-	10,5	-	-	-	-	10xC	-
	max	0,08	0,80	1,00	0,020	0,030	13,50	0,6	0,50	0,75	-	0,75	-
RW 410	min	-	-	-	-	-	12,0	-	-	-	-	-	-
	max	0,12	0,60	0,50	0,020	0,030	13,5	0,5	0,50	0,40	-	-	-
RW 410NIMO	min	-	-	-	-	-	11,0	4,0	0,40	-	-	-	-
	max	0,05	0,60	0,50	0,020	0,030	12,5	5,0	0,70	0,30	-	-	-
RW 4122	min	0,33	-	-	-	-	15,5	-	0,90	-	-	-	-
	max	0,43	1,00	0,70	0,020	0,030	17,5	1,0	1,20	-	-	-	-
RW 420	min	0,30	-	-	-	-	12,0	-	-	-	-	-	-
	max	0,40	0,60	0,50	0,030	0,030	14,0	0,6	0,75	0,75	-	-	-
RW 420C	min	0,38	0,30	-	-	-	12,0	-	-	-	-	-	-
	max	0,43	0,60	0,50	0,030	0,030	14,0	0,6	0,75	0,75	-	-	-
RW 430	min	-	-	-	-	-	16,0	-	-	-	-	-	-
	max	0,10	0,60	0,50	0,030	0,030	17,0	0,6	0,75	0,75	-	-	-
RW 430LNB	min	-	-	-	-	-	17,8	-	-	-	-	0,05+ 7(C+N)	-
	max	0,02	0,80	0,50	0,020	0,030	18,8	0,5	0,30	0,30	0,02	0,5	-
RW 430LNBTI	min	-	-	-	-	-	17,5	-	-	-	-	8xC	10xC
	max	0,03	1,50	1,00	0,300	0,030	19,5	0,5	0,50	0,50	0,02	0,80	0,50
RW 2594	min	-	-	-	-	-	24,0	8,0	2,50	-	0,2	-	-
	max	0,03	2,50	1,00	0,020	0,030	27,0	10,5	4,50	1,5	0,3	-	-

RODACCIAI'S DENOMINATIONS EQUIVALENT

	EN ISO 14343-A: 2017 Nominal composition	EN ISO 14343-B: 2017 Grades	AWS A5.9/A5.9M:2022 Denomanation of grades	AWS A5.9/A5.9M:2022 Nominal Composition Designation	DIN Nr material
RW 307	18 8 Mn	-	-	18 8 Mn	1.4370
RW 307L	18 8 Mn	-	-	18 8 Mn	1.4370
RW 307SI	18 8 Mn	-	-	18 8 Mn	1.4370
RW 308L	19 9 L	-	-	19 9 L	-
RW 308LAWS	19 9 L	SS308L	ER308L	19 9 L	1.4316
RW 19-9-L	19 9 L	SS308L	ER308L	19 9 L	1.4316
RW 308LSI	19 9 L Si	SS308LSi	ER308LSi	19 9 L Si	1.4316
RW 308H	19 9 H	SS308H	ER308H	19 9 H	-
RW 309L	23 12 L	SS309L	ER309L	23 12 L	1.4332
RW 309SI	-	SS309Si	ER309Si	-	(1.4829)
RW 309LSI	23 12 L Si	SS309LSi	ER309LSi	23 12 L Si	1.4332
RW 309LMO	23 12 2 L	-	-	23 12 2 L	(1.4459)
RW309H	22 12 H	SS309	ER309	22 12 H	-
RW 310	25 20	SS310	ER310	25 20	(1.4842)
RW 312	29 9	SS312	ER312	29 9	1.4337
RW 316L	19 12 3 L	-	-	19 12 3 L	1.4430
RW 316LAWS	19 12 3 L	SS316L	ER316L	19 12 3 L	1.4430
RW 316LSI	19 12 3 L Si	SS316LSi	ER316LSi	19 12 3 L Si	1.4430
RW 316H	19 12 3 H	SS316H	ER316H	19 12 3 H	-
RW 317LAWS	18 15 3 L	SS317L	ER317L	18 15 3 L	-
RW 318SI	19 12 3 Nb Si	-	(ER318)	19 12 3 Nb Si	1.4576
RW 347	19 9 Nb	SS347	ER347	19 9 Nb	1.4551
RW 347SI	19 9 Nb Si	SS347Si	ER347Si	19 9 Nb Si	1.4551
RW 385	20 25 5 Cu L	SS385	ER385	20 25 5 Cu L	-
RW 2209	22 9 3 N L	SS2209	ER2209	22 9 3 N L	(1.4462)
RW 409CB	-	SS409Nb	ER409Nb	-	-
RW 410	13	SS410	ER410	13	-
RW 410NIMO	13 4	SS410NiMo	ER410NiMo	13 4	-
RW 4122	-	-	-	-	1.4122
RW 420	-	SS420	ER420	-	-
RW 420C	-	(SS420)	(ER420)	-	1.4031
RW 430	(17)	SS430	ER430	(17)	1.4016
RW 430LNB	18 LNb	(SS430LNb)	(ER430LNb)	18 L Nb	1.4511
RW 430LNBTI	18 L Nb Ti	-	-	18 L Nb Ti	-
RW 2594	25 9 4 N L	SS2594	ER2594	25 9 4 N L	-

PRODUCTION RANGE AND FINISHING

WELDING PROCESSES		SIZE	PACKAGING																								
MIG	mm inches	0,80 - 0,90 - 1,00 - 1,14 - 1,20 - 1,60 0.030 - 0.035 - 0.045 - 1/16	<p>Plastic spool D200 - size: width 55 mm - outside diameter: 200 mm - spindle hole diameter: 51,5 mm - weight: 5 kg</p> <p>Plastic spool D300 - size: width 100 mm - outside diameter: 300 mm - spindle hole diameter: 51,5 mm - weight: 12,5 kg (for diameter ≤0,8 mm) 15 kg (for diameters >0,8 mm)</p> <p>Blue metallic wire basket BS300 - size: width 100 mm - outside diameter: 300 mm - inside diameter: 51,5 mm - weight: 15 kg</p> <p>Bulk spool / wooden / metallic - size: width 285 mm - outside diameter: 750 mm - spindle hole diameter: 41 mm - weight: 250 kg</p> <p>Drum for robotic welding</p> <table border="1"> <tr> <td>- wire diameter (mm):</td> <td>0,8</td> <td>0,9</td> <td>1,0</td> <td>1,2</td> <td>1,6</td> </tr> <tr> <td>- height of drum (mm):</td> <td>670</td> <td></td> <td>790</td> <td></td> <td>790</td> </tr> <tr> <td>- outside diameter (mm):</td> <td>510</td> <td></td> <td>520</td> <td></td> <td>580</td> </tr> <tr> <td>- weight (kg):</td> <td>150</td> <td></td> <td>250-400</td> <td></td> <td>250-400</td> </tr> </table>	- wire diameter (mm):	0,8	0,9	1,0	1,2	1,6	- height of drum (mm):	670		790		790	- outside diameter (mm):	510		520		580	- weight (kg):	150		250-400		250-400
- wire diameter (mm):	0,8	0,9	1,0	1,2	1,6																						
- height of drum (mm):	670		790		790																						
- outside diameter (mm):	510		520		580																						
- weight (kg):	150		250-400		250-400																						
TIG	mm inches	0,80 - 0,90 - 1,00 - 1,14 - 1,20 - 1,60 2,00 - 2,40 - 3,20 - 4,00 0.030 - 0.035 - 0.045 - 1/16 3/32 - 1/8 - 5/32	<p>Rods - length 1000 mm (Ø in mm)/36 inches (Ø in inches) - stamped with AWS and W.Nr. ref. - packed boxes or cardboard tubes - weight: 5 kg</p>																								
SUBMERGED ARC	mm inches	1,60 - 2,00 - 2,40 - 3,20 - 4,00 1/16 - 5/64 - 3/32 - 1/8 - 5/32	<p>Metallic wire basket K415 - size: width 100 mm - outside diameter: 415 mm - inside diameter: 300 mm - weight: 25 kg</p> <p>Drum - wire diameter: 2,0 - 4,0 mm - height of drum: 850 mm - outside diameter: 660 mm - weight: 300 kg</p>																								
CORE WIRE IN CUT LENGTHS OR IN COILS	mm inches	1,60 - 2,00 - 2,50 - 3,25 - 4,00 - 5,00 1/16 - 5/64 - 3/32 - 1/8 5/32 - 3/16	<p>Core wires in cut lengths - length 250 - 450 mm (9 - 18 inches) - packed in wooden crates sizes: - 800 - 1.000 kg, base 750x800 mm - height 500 mm - 500 - 650 kg, base 820x570 mm - height 580 mm</p> <p>Core wires in coils - size: internal diameter: 380 mm - weight: 500/800 kg</p>																								



SUSTAINABILITY PRESERVING THE FUTURE



“SUSTAINABILITY”, A STRATEGIC ELEMENT OF RODASTEEL

Based on the guidelines given by the United Nation Climate Conferences, Rodacciai coined its own three pillars: people, planet and performances.



PEOPLE

It is important for Rodasteel to create a work environment that attracts more and more talented individuals and retains those already present



PLANET

Rodasteel places environmental conservation as a fundamental aspect of its production activities and growth objectives



PERFORMANCE

Rodasteel pays particular attention to the efficiency and reduction of its energy consumption

2030





PEOPLE

Since people are the basis of our success, it is important for Rodasteel to create a work environment that attracts more and more talented individuals and retains those already present for as long as possible.

For this reason, Rodacciai invests in people trainings represented by two main projects: Rodacciai Academy and Rodajob.

Rodacciai Academy: inaugurated in 2015, it deals with the development and skills of the company’s human resources in collaboration with stakeholders and the local area. The goal is the transmission and development of knowledge and professional experience, with specific programs dedicated to employees, school and university students and unemployed.

Rodajob: inaugurated in 2019, it is a non-profit foundation composed of 26 other

companies and 11 training institutions. The main activity consists in the provision of professionalizing training courses, mainly dedicated to unemployed, precarious young people and high school students. Rodasteel offers and guarantees equal opportunities to all its employees regardless of gender, geographic origin, disability or any other difference. Respect for diversity and combating discrimination are also central to the Rodacciai Code of Ethics, alongside other social topics such as the promotion and support of human rights.

Moreover, Rodacciai supports its employees by investing in welfare services. Rodacciai Welfare is a platform aimed at promoting people health and safety.

This tool gives people the access to special services in order to improve their work-life balance and possibilities.

HIRING RATE

Hiring rate increase (expressed in percentage)



TRAINING RATE

Total training hours per employee (expressed in hours per capita)



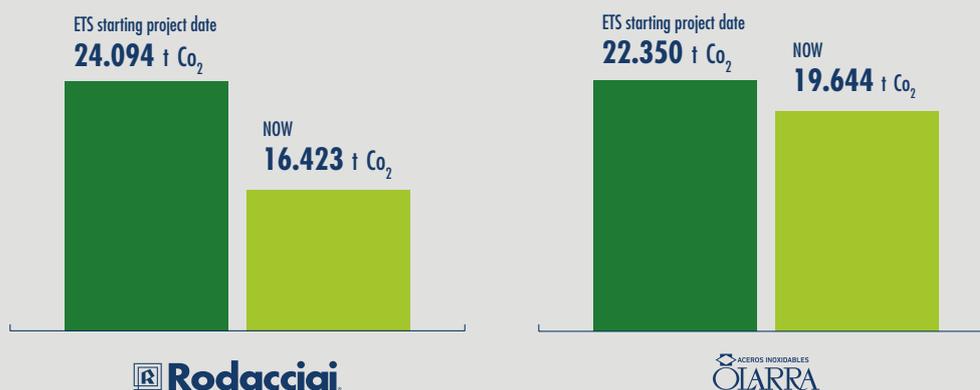


Rodasteel places environmental conservation as a fundamental aspect of its production activities and growth objectives. The company is committed to continuously monitoring and evaluating its environmental impacts to identify winning strategies and innovative solutions to mitigate and reduce them. Responsible **management of raw materials** is a fundamental point for Rodacciai environmental strategy plan. Even though steel is originally created from virgin ferrous minerals, nowadays it can be considered both durable and permanent. In fact, the most used raw material is scrap metal that is 100% recyclable and capable of being remelted without ever losing any of its characteristic properties. For this reason, Rodasteel is gradually reducing the consumption of virgin raw materials and limiting the production of waste through recovery and reuse.

Waste management is extremely important for a company that aspires to monitor and consequently reduce its environmental impacts. According to that aspect, in line with the Group's principle of implementing circular economy initiatives, Olarra concluded in 2021 the project aimed at enhancing the waste produced and reducing the consumption of virgin materials: the Tarcinox project. The initiative aimed at recovering three of the main types of waste produced by Olarra: slag and dust in steelworks and sludge produced in rolling mills. The project is a continuation of an earlier industrial waste initiative (PIVASI) and the starting point of a new plan for the next period, focused on the recovery of the metals contained in the settling sludge as well as in the search for alternatives for the management and valorisation of steel slag. This path demonstrated the continuous improvements and developments put in place by the corporation.

GREENHOUSE GAS (GHG) EMISSIONS

Values of greenhouse gas emissions (expressed in Co₂ tonnage). The reference period is from the ETS (Emission Trading System) starting project date for the production plant to today.



Rodasteel pays particular attention to the efficiency and reduction of its **energy consumption**. With this purpose, Rodacciai carried out maintenance activities on the heating system of the furnace used for billet processing. In addition, the upgrade of lighting systems with LED lamps was promoted. For the Group it is also important the monitoring of **pollutants emissions** into the atmosphere. In order to obtain an annual estimate of air emissions for each pollutant the Group first carried out sampling at each site and then multiplied the average concentrations measured at each chimney by the average flows recorded at the time of sampling and by the yearly operating hours of the systems.

Moreover, in order to reduce its **greenhouse gas (GHG) emissions** and to improve the environmental impact the Group made the following investments:

- Burners were revamped (Sirone Plant);
- Construction of a regasifier for the use of biogas (Sirone plant);

- Improvement of two heat treatment furnaces (Olarra plant);
 - The purchase and installation of a new bell furnace for roll treatment (Olarra plant);
- With an on going perspective, Rodasteel Group, as a member of ETS is defining its road map with the aim of reducing atmospheric emissions and using resources increasingly from renewable sources, in accordance to the goal defined by the European community.

As for **electricity consumption**, the installation of solar panels in all production halls and the office building continues.

Responsible management of **water resources** is another important objective for environmental sustainability within the steel industry.

Therefore, Rodasteel Group adopted a global strategy with specific projects for all its production sites. For instance, about 346 thousand cubic meters of water were withdrawn in 2022, a 16% decrease from the previous year (-7% from 2020).



PERFORMANCES

The environmental sustainability of production processes is a priority for the industrial world and Rodacciai's mission is to accompany its customers in the sustainable steel supply chain.

With this purpose, the Group has planned a path based on some key points:

- Definition of a Sustainability and Decarbonisation Committee
- Increasing the energy efficiency of production processes
- Conservation of water resources
- Sourcing from renewable or more sustainable sources
- Optimisation of waste management
- Development of an automatic performance monitoring system
- Development of the fifth sustainability report for 2023
- Launch of a decarbonisation plan to 2030
- Maintaining the ISO 14001 standard



REDUCTION PROJECT

SCOPE 1

- Rolling Mill Furnace fuel supply: a new regasifier for BioGNL
It will supplement the energy needs of the billet heating furnace reducing the consumption of natural gas.
- Forklift fuel supply: turning from Diesel to Biodiesel.
Thanks to this project, implemented in the first two months of 2024, it is possible to use Biodiesel fuel for forklifts.
- GOs: Green Energy Procurements.
The group favors the supply of natural gas, which guarantees the lowest possible carbon footprint.
- Efficiency improvement.
Continuous upgrading of productions facilities.



SCOPE 2

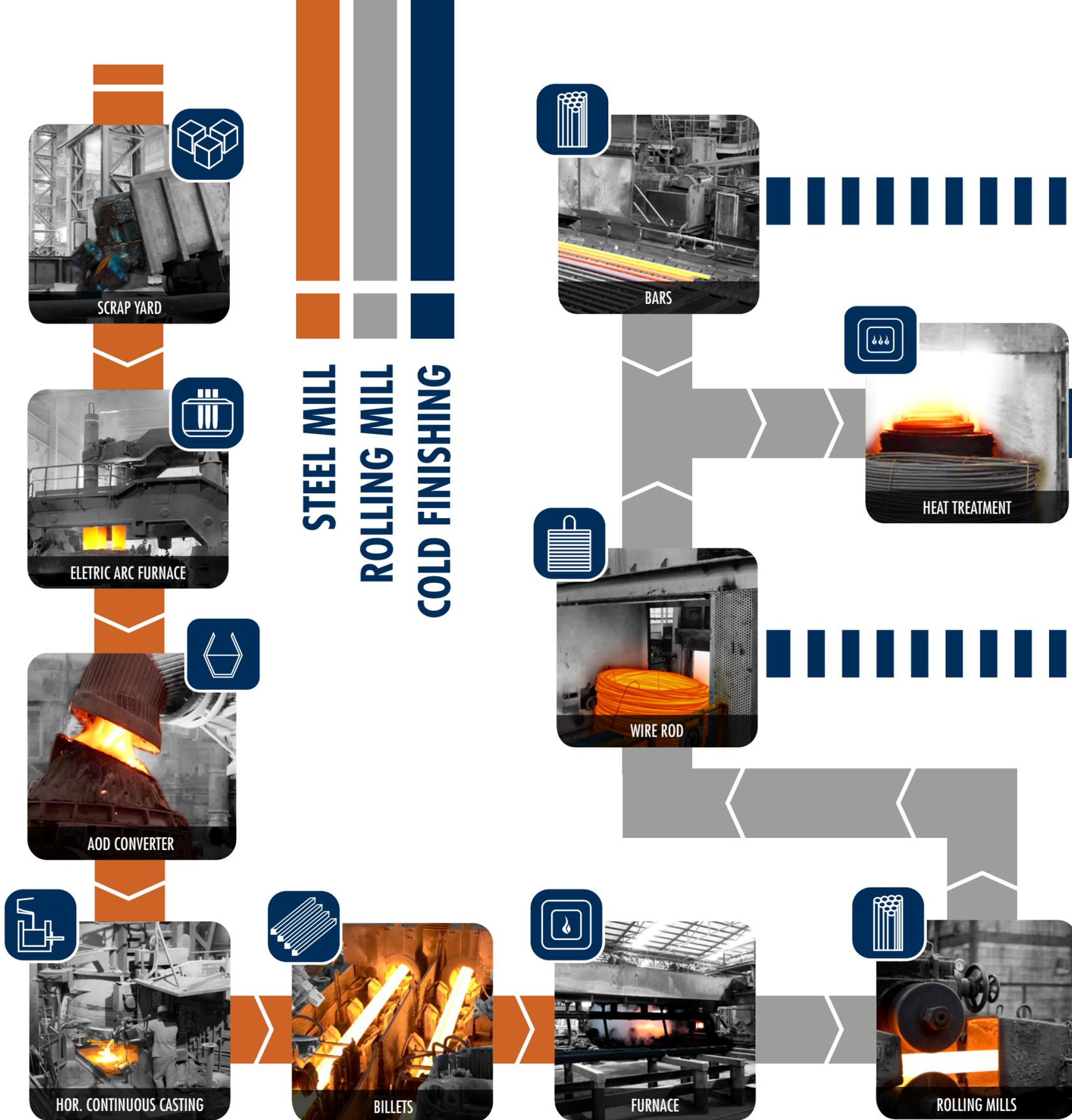
- Renewable power generation and self-consumption: Solar Power plants
Since 2013 the company has been accommodating solar power plants that produce renewable power for the national grid. Moreover, it is planned to install other solar power plants for the self-consumption.
- PPA e GO: green power procurement.
The group is planning to gradually increase the consumption of renewable electrical energy through PPA contracts or equipped with Guarantees of Origin guaranteeing the lowest possible carbon footprint.
- Efficiency improvement.
Continuous upgrading of productions facilities.



SCOPE 3

- Multimodal goods transport : Road – Rail – Sea
The company selects the transport service providers verifying that they adopt multi-modal solutions that guarantee excellent performance in terms of CO_2 - equivalent reduction.
- Truck fuel supply: turning from Diesel to Biodiesel
The group has engaged one of main road transport service partners to ensure the use of Biodiesel to power the vehicles used to transport our goods.





STAINLESS STEEL SOLUTIONS ALL IN HOUSE FROM THE SCRAP TO THE FINISHED PRODUCT

Rodasteel Corporation has always distinguished itself through a unique production philosophy and the choice to have a complete vertical cycle for stainless steel products.

The ALL IN HOUSE strategy, from the scrap to the finished product, can guarantee constant monitoring of each step of the production cycle and provides a unique production flexibility and responsiveness. This aspect is always accompanied by a continuous focus on quality and the certification of products and processes.



Rodacciai, Bosisio Parini (steel mill)
Rodacciai, Sironè (rolling mill)



Olarra, Bilbao
(cold finishing plant)

STEEL MILL

ROLLING MILL

COLD FINISHING

FURTHER PRODUCTION PROCESSES (IF NECESSARY)

www.rodacciai.com

Rodacciai

Rodacciai S.p.a. - Headquarter
Bosisio Parini (LC) Via Giuseppe Roda 1, 23842
Tel. +39 031878111
sales@rodacciai.com | info@rodacciai.com
www.rodasteel.ch