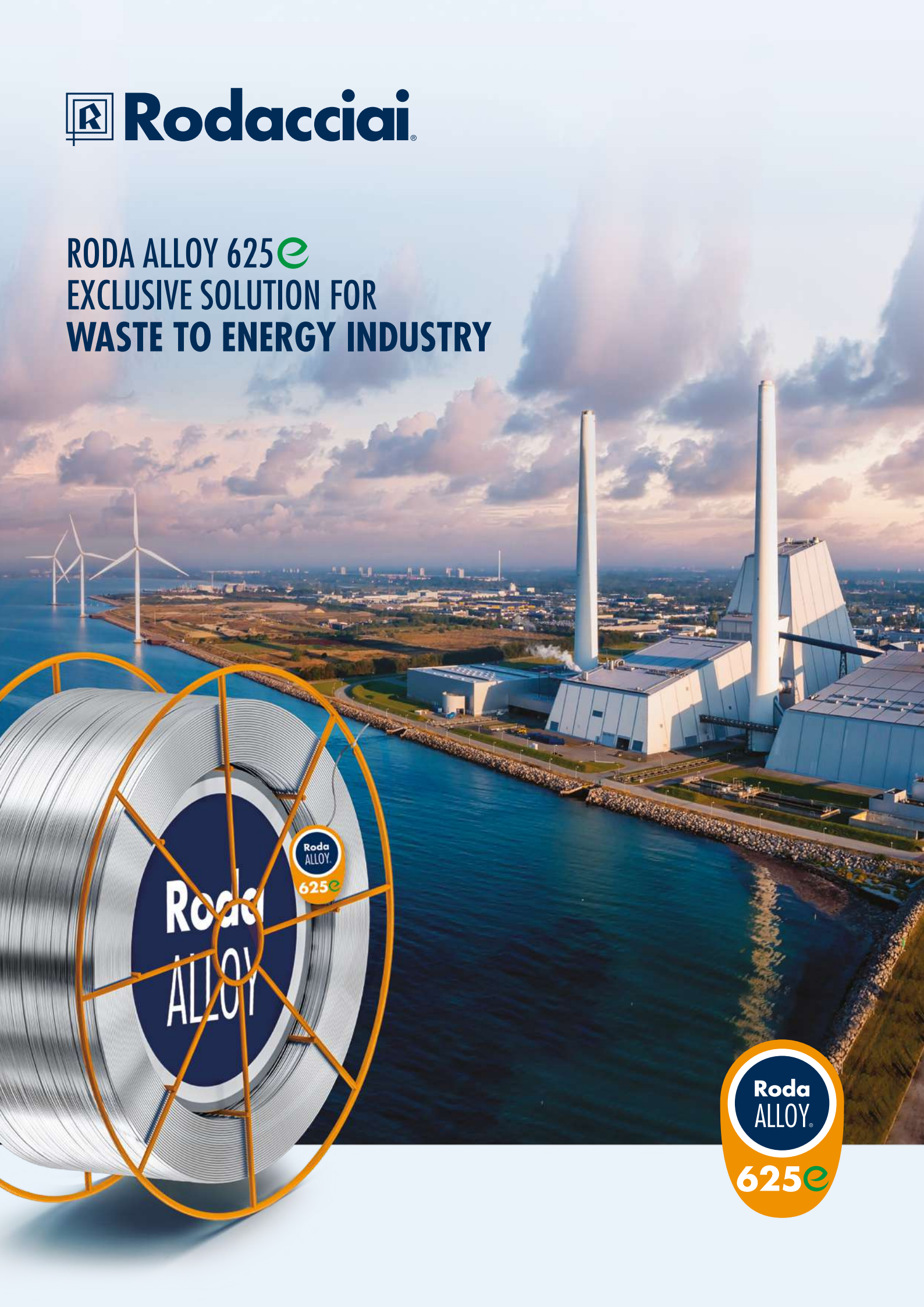
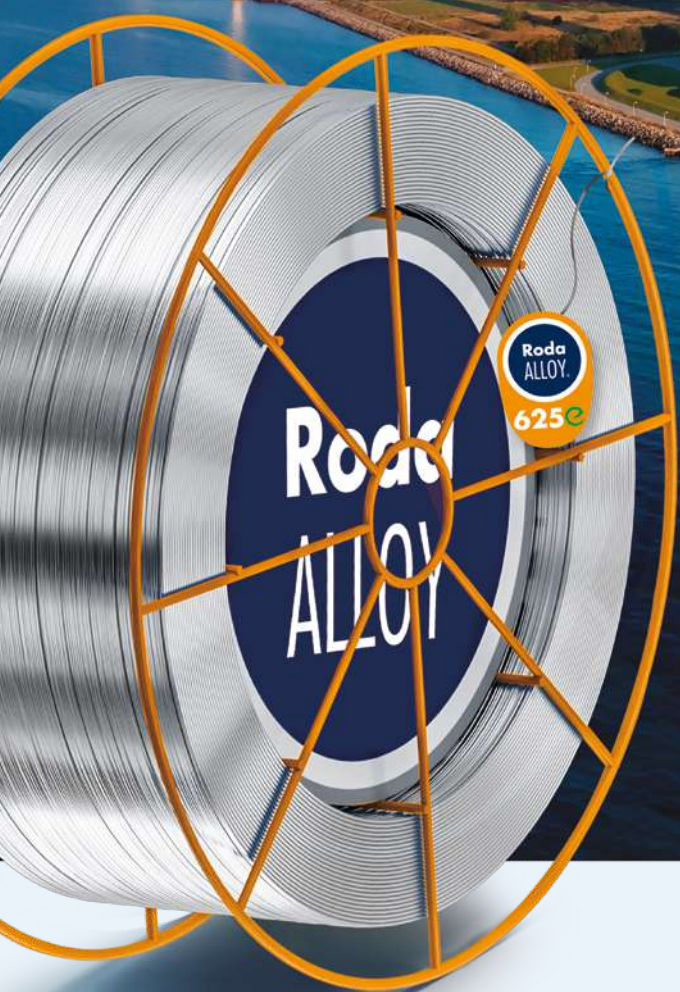




RODA ALLOY 625^e
EXCLUSIVE SOLUTION FOR
WASTE TO ENERGY INDUSTRY



WASTE TO ENERGY INDUSTRY

AN EXCLUSIVE SOLUTION FOR OVERLAY CLADDING PROTECTION IN WtE INDUSTRY

A recent study conducted by the Earth Energy Center at Columbia University shows the enormous potential of modern technologies that, by converting waste into energy, improve energy security, reduce greenhouse gas emissions, decrease pollution and landfill waste production. One of the biggest challenges for the Waste to Energy actors is the costs reduction of the maintenance and repairing of the waste incineration plants main components.

For this purpose, they have to act on the control of the corrosion caused by the combustion technologies used in this industry:

- RDF (refuse-derived fuel)
- mass - burning

Both these methods involve a great variety of combustibles (e.g. plastic, paper and industrial wastes).

These elements, when incinerated, create an atmosphere rich in chlorine, corrosive gasses, ashes and molten salts, which in contact with the cooler tube surface produce the alkaline sulfates, causing oxidation.

In a sustainability perspective, Rodacciai, with its R&D and internal laboratory, has developed a steel solution with a focus on the Waste to Energy industry, proposing an high temperature welding consumable alloy,

RODA ALLOY 625 (ERNiCrMo-3).

Thanks to its extremely high corrosion resistance and its customizable features, this product is the perfect solution for critical environments.

Roda Alloy 625 is applied as an overlay cladding protection, using a gas metal arc welding process.





HIGH VALUE SOLUTION FOR THE OVERLAY CLADDING PROTECTION

RODA ALLOY 625e overlay provides a consistent reduction of metal loss in areas where corrosion level is very high and where carbon and low-alloy steels are subjected to a rapid corrosive attack.

APPLICATIONS

The main applications of **Roda Alloy 625e** are related to the WtE industry, in particular to the waste incineration plants.

The three main components where the product can be used as an overlay cladding protection are:

- Boiler banks & tube fireside;
- Membrane walls;
- Superheater pipes.

RODA ALLOY 625e ADVANTAGES

It is estimated that a carbon / low-nickel alloy pipes or membrane walls without 625 overlay cladding protection have a life cycle lower than one year.

Whereas the high pitting resistance of 625 due to its austenitic chemical analysis (high content of Ni-Cr-Mo) triple the components life.

This advantage permits a consistent reduction of repairing, maintenance and replacement of these parts in term of costs and frequency.

The R&D department and a staff of specialized technicians constantly study the product features directly with the customers. The aim is the one to propose a customized solution to be a partner in the customer development.





BE A PARTNER IN THE CUSTOMER DEVELOPMENT

**OEE PLANT
IMPROVEMENT**

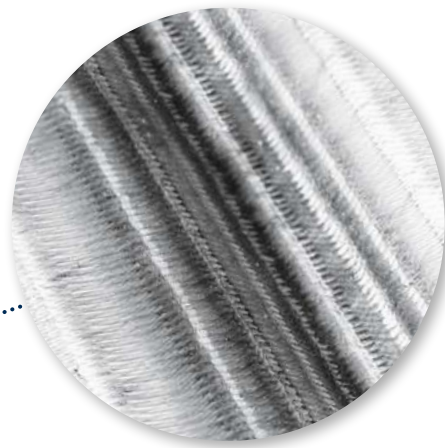
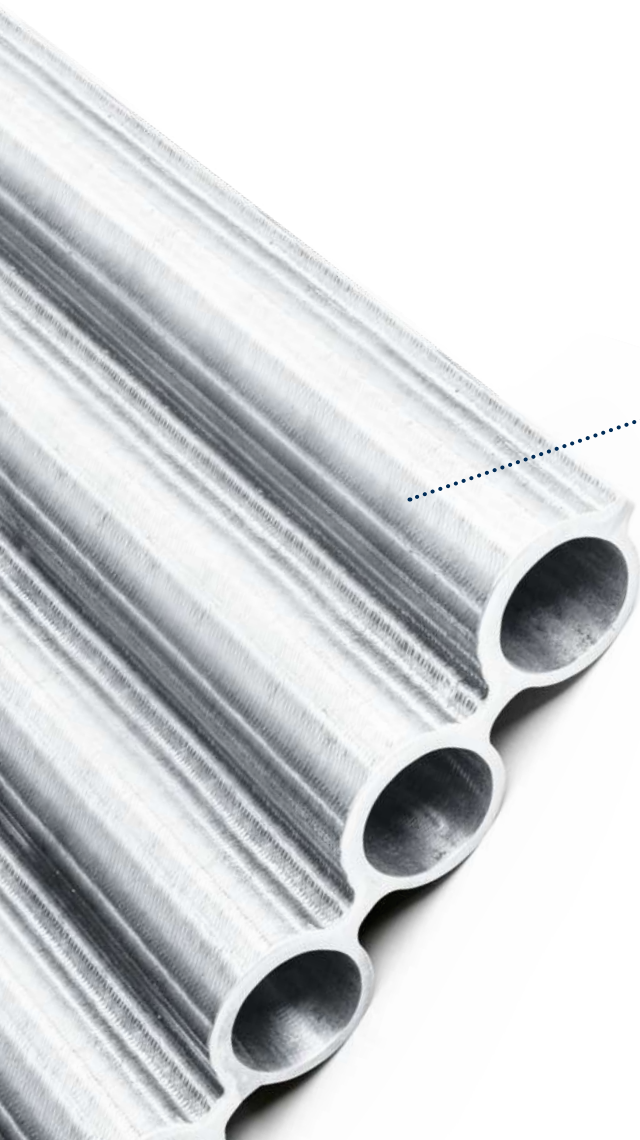
Study customized solutions to optimize the welded bead

**REDUCED
REPAIRING COSTS**

Dedicated production department focused on a continuous improvement

**QUALITY
CONSTANCY**

High quality constantly ensured by continuous investments, analyses and controls



**RODA ALLOY PRODUCTS
FOR CLADDING APPLICATIONS**

Cladded pipe made with Roda Alloy 625 

**WIRE
STABILITY**

**OVERLAY
IMPROVEMENT**

625e

▶ Production processes
and product
performances
always updated

▶ Calibrated wire
studied and
developed on
customer's needs



DATASHEET RODA ALLOY 625e (ERNICRMO-3) – MIG – TIG

VdTUV - Merkblatt 1153 Approved - DESCRIPTION AND APPLICATIONS

Roda Alloy 625e is developed for welding applications at working temperature from -269°C to above 1000°C . It's suitable for welding heat resistant alloys, dedicated and studied for **power generation**, **petrochemical plants** and **furnace equipment**. It can also be used for overmatching corrosion-resistant welds in Alloy 825, 6%Mo superaustenitic stainless 254SMo, Alloy 28, 904L, and for overlays on valves, pumps and shafts in **marine** and **offshore equipment**, where high pitting resistance (PRE>50) and tolerance to weld metal dilution are required. In addition to the above materials, Roda Alloy 625e is used as filler metal for cladding and welding dissimilar base metals such as Ni-Cr-Mo alloys to stainless and carbon steels.

APPROXIMATE EQUIVALENT WITH OTHER STANDARDS

Rodacciai Denomination	Roda Alloy 625e
EN ISO 18274:2010	Ni 6625 - NiCr22Mo9Nb
AWS A5.14/A5.14M: 2018	ERNiCrMo-3 - N06625
DIN Werkstoff Nr.	2.4831 - 2.4856

FILLER METAL PROPERTIES

Typical Chemical composition (nominal) in %

C	Mn	Si	S	P	Cr	Ni	Mo	Cu	Al	Ti	Fe	Nb+Ta
0,02	0,2	0,2	0,005	0,005	22	63	8,5	0,06	0,2	0,2	≤0,5	3,5

EXPECTED MINIMUM MECHANICAL PROPERTIES AS WELDED

Temperature		20°C	-196°C
Yield strength, Rp 0,2	MPa min	480	
Tensile strength, Rm	MPa min	750	
Elongation, A5	% min	35	
Impact energy, ISO – V	J min	110	65
PRE	min	50	

TYPICAL WELDING PARAMETERS

Process	Diameter		Volt	Ampere	Gas
	mm	inches			
MIG	1,0	0.035	20 - 25	110 - 150	100% Ar
	1,2	1/16	24 - 26	180 - 220	100% Ar
	1,6				
TIG	1,6	1/16	11 - 14	125 - 185	100% Ar
	2,0	3/32	11 - 14	115 - 165	100% Ar
	2,4				
	3,2				

Welding positions down hand, horizontal/vertical, vertical upward, overhead. Highest operating temperature, in the short term range, as for base metal, but not higher than 1000°C . Lowest operating temperature, as for base metal, but not lower than -196°C

SIZES

diam. mm 0,80 – 0,90 – 1,00 – 1,14 – 1,20 – 1,60 – 2,00 – 2,40 – 3,20 – 4,00

diam. inches 0.030 – 0.035 – 0.045 – 1/16 – 3/32 – 1/8 – 5/32

PACKAGING FORMS

TIG: Carton boxes of 5 kg / 10 lb. Red, cardboard tubes of 5 kg / 10 lb. Wooden crates of 250 kg / 660 lb .

MIG: Metallic wire baskets BS300 of 15 kg / 33 lb. Plastic spools D300 of 12,5 kg / 25 lb for diam. 0,80 mm and of 15 kg / 33 lb for the other diameters.

Plastic spools D200 of 5 kg / 10 lb. Bulk spool on wood or steel up to 250 kg / 550 lb. Drum for robotic welding up to 400 kg / 880 lb.

Submerged Arc: Metallic wire basket K415 of 25 kg / 55 lb Drum for robotic welding up to 300 kg / 660 lb.

Core Wire: Core wires in cut lengths 250 - 450 mm (9 - 18 inches), or Core wires in coils weight up to kg 800 1750 lb.

PRODUCTION RANGE, FINISHING AND PACKAGING SOLUTIONS

WELDING PROCESSES		SIZE	PACKAGING																								
MIG	mm	0,80 - 0,90 - 1,00 - 1,14 - 1,20 - 1,60	<p>Plastic spool D200 - size: width 55 mm - outside diameter: 200 mm - spindle hole diameter: 51,5 mm w- 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																						
inches	0.030 - 0.035 - 0.045 - 1/16																										
TIG	mm	0,80 - 0,90 - 1,00 - 1,14 - 1,20 - 1,60 2,00 - 2,40 - 3,20 - 4,00	<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>																								
	inches	0.030 - 0.035 - 0.045 - 1/16 3/32 - 1/8 - 5/32																									
SUBMERGED ARC	mm	1,60 - 2,00 - 2,40 - 3,20 - 4,00	<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>																								
	inches	1/16 - 5/64 - 3/32 - 1/8 - 5/32																									
CORE WIRE IN CUT LENGTHS OR IN COILS	mm	1,60 - 2,00 - 2,50 - 3,25 - 4,00 - 5,00	<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>																								
	inches	1/16 - 5/64 - 3/32 - 1/8 5/32 - 3/16																									

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 steel, alloy steels and carbon steels all over the world. The secret of this success is based on our extensive and diversified range of high quality products, on paying attention to our customers, on our ability to innovate continuously and on the experience of our 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

Acquisition of the company Olarra Aceros Inoxidables

1995-2005

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

2007-2016

Investments for production expansion

2024

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

LABORATORY & 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.



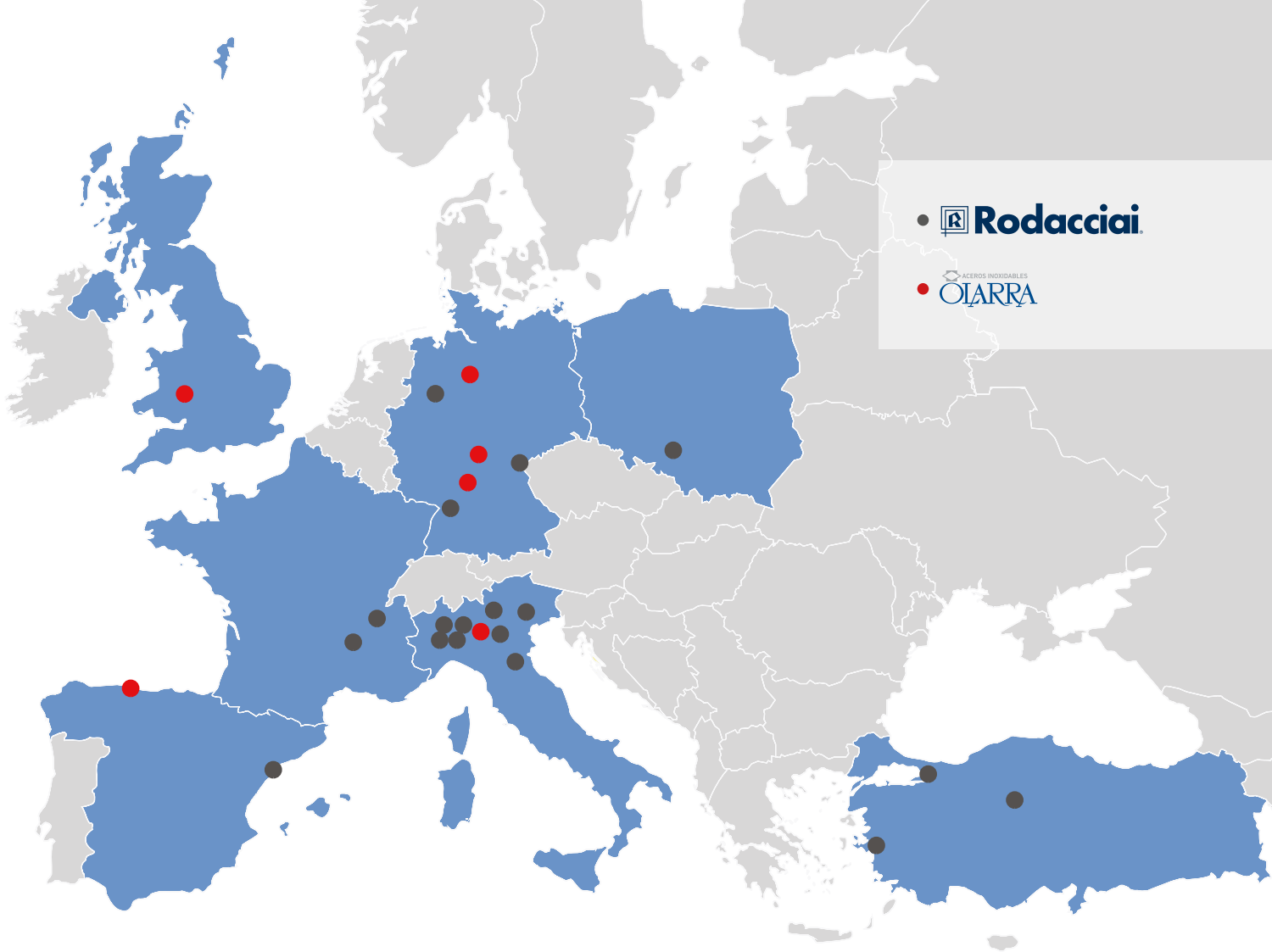
Rodacciai | LAB



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.



•  **Rodacciai**

•  **OIARRA**



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
City: Gliwice

  **Rodacciai S L**

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

  **BIMEN 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

  **C&S**

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

  **ALUPRA**

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

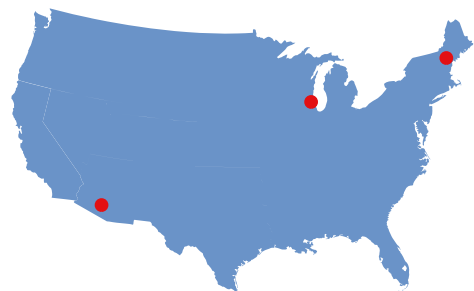
  **IGM**

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

  **OIARRA**

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

USA



  **OIARRA - Italia**

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

  **OIARRA U.K LTD**

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

  **Roda Specialty Steel**

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

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.

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

companies and 11 training institutions. The main activities consist 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.

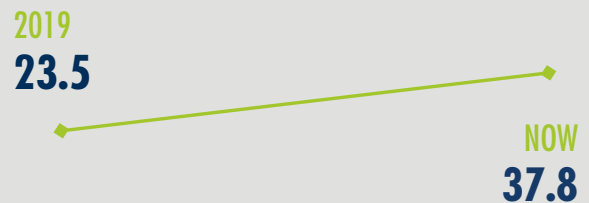
HIRING RATE

Hiring rate increase (expressed in percentage)



TRAINING RATE

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



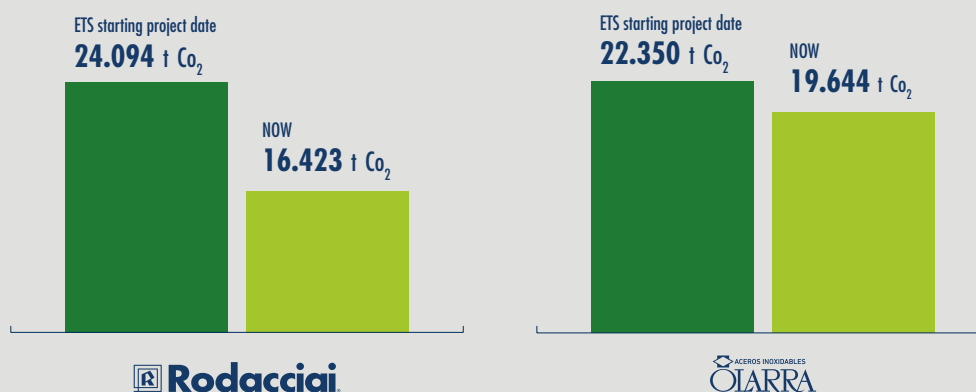


Rodasteel places environmental conservation as a fundamental aspect of its production activities and growth objectives. The company is committed to continuously monitoring and evaluating its environmental impacts to identify winning strategies and innovative solutions to mitigate and reduce them. Responsible **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 select the transport service providers verifying that they adopt multi-modal solutions that guarantee excellent performance in terms of CO2-equivalent reduction.
- Truck fuel supply: turning from Diesel to Biodiesel
The group have engaged one of our main road transport service partners to ensure the use of Biodiesel to power the vehicles used to transport our goods.





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