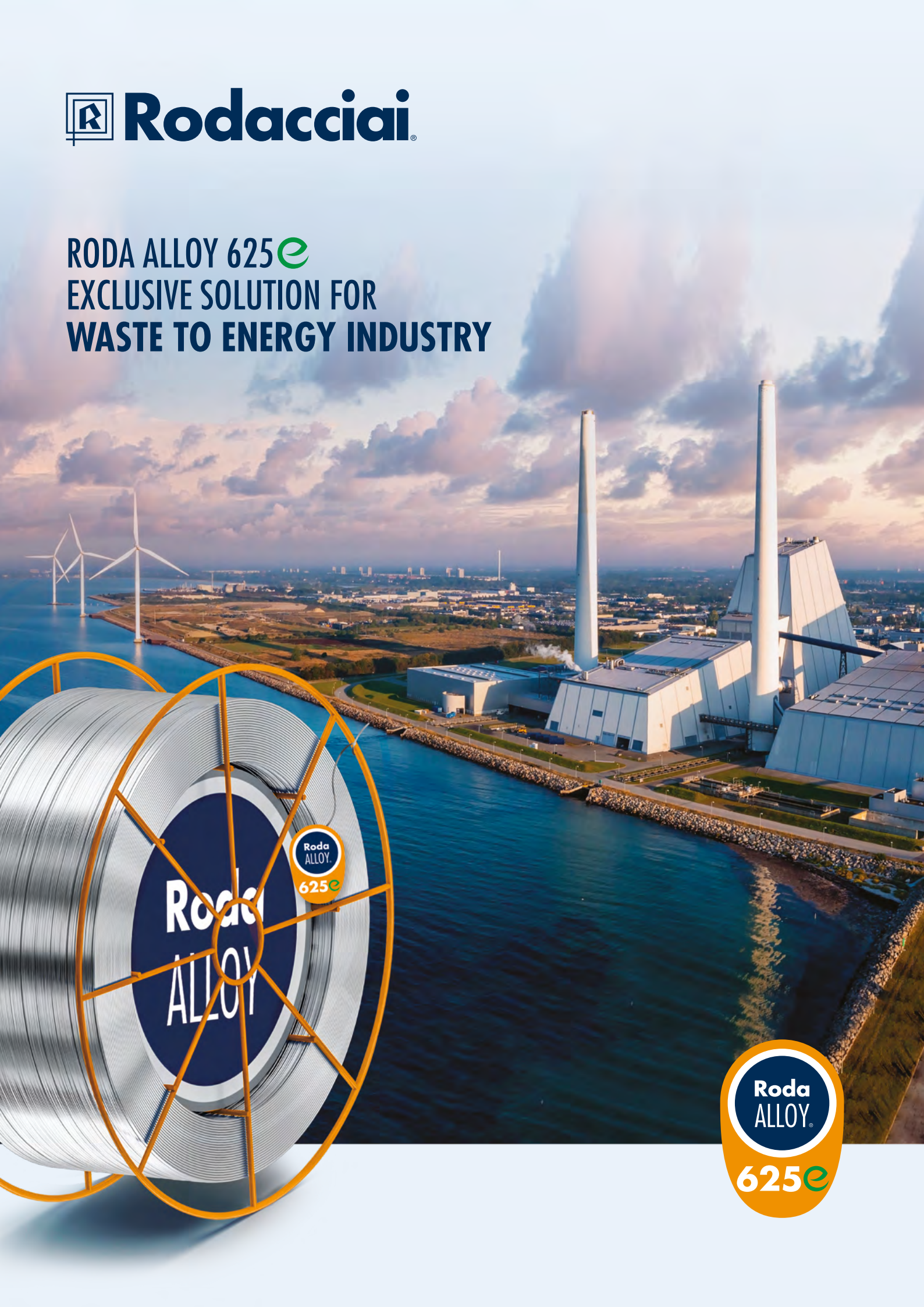
Rodacciai®

RODA ALLOY 625e
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 e (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 e 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

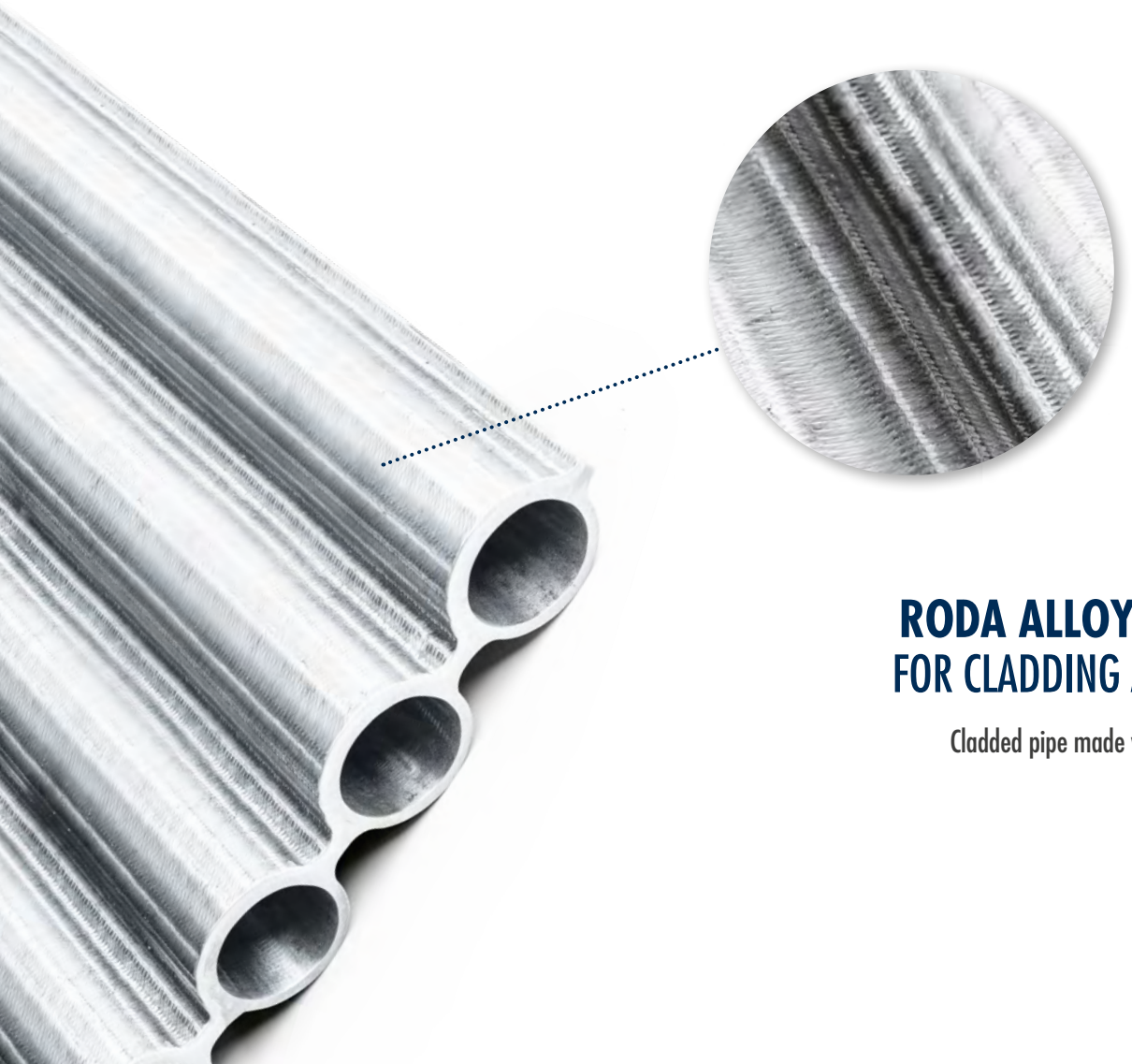
Study customized solutions to optimize the welded bead

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 e

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 - NO6625
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 mm	Diameter inches	Volt	Ampere	Gas
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

<table>
<tr><th>WELDING PROCESSES</th><th></th><th>SIZE</th><th>PACKAGING</th></tr>
<tr><td rowspan="2">MIG</td><td>mm

inches</td><td>0,80 - 0,90 - 1,00 - 1,14 - 1,20 - 1,60

0.030 - 0.035 - 0.045 - 1/16</td><td>
Plastic spool D200
- size: width 55 mm
- outside diameter: 200 mm
- spindle hole diameter: 51,5 mm
w- weight: 5 kg

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)

Blue metallic wire basket BS300
- size: width 100 mm
- outside diameter: 300 mm
- inside diameter: 51,5 mm
- weight: 15 kg

Bulk spool / wooden / metallic
- size: width 285 mm
- outside diameter: 750 mm
- spindle hole diameter: 41 mm
- weight: 250 kg

Drum for robotic welding
<table>
<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 colspan="3">790</td><td>790</td></tr>
<tr><td>- outside diameter (mm):</td><td>510</td><td colspan="3">520</td><td>580</td></tr>
<tr><td>- weight (kg):</td><td>150</td><td colspan="3">250-400</td><td>250-400</td></tr>
</table>
</td></tr>
<tr><td>TIG</td><td>mm

inches</td><td>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</td><td>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</td></tr>
<tr><td>SUBMERGED ARC</td><td>mm

inches</td><td>1,60 - 2,00 - 2,40 - 3,20 - 4,00

1/16 - 5/64 - 3/32 - 1/8 - 5/32</td><td>
Metallic wire basket K415
- size: width 100 mm
- outside diameter: 415 mm
- inside diameter: 300 mm
- weight: 25 kg

Drum
- wire diameter: 2,0 - 4,0 mm
- height of drum: 850 mm
- outside diameter: 660 mm
- weight: 300 kg
</td></tr>
<tr><td>CORE WIRE IN CUT LENGTHS OR IN COILS</td><td>mm

inches</td><td>1,60 - 2,00 - 2,50 - 3,25 - 4,00 - 5,00

1/16 - 5/64 - 3/32 - 1/8
5/32 - 3/16</td><td>
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

Core wires in coils
- size: internal diameter: 380 mm
- weight: 500/800 kg
</td></tr>
</table>

COMPANY PROFILE

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

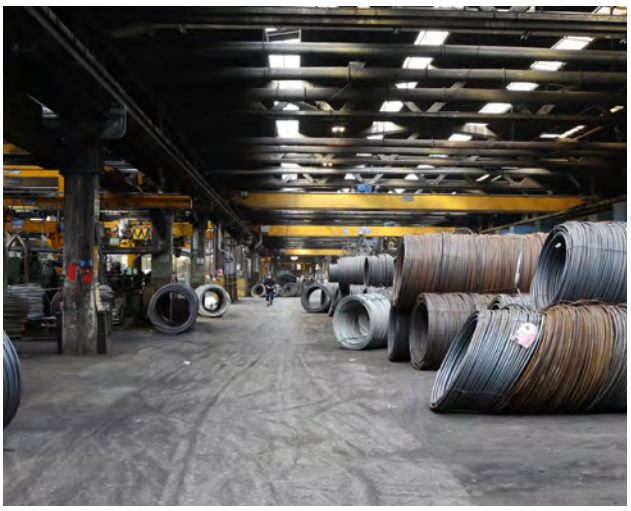
1960
Introduction of lead alloy steel processing, considered to be the best in the world

1971
Construction of the new plant in Bosisio Parini

1981
Construction of the Sirone plant, with the rolling mill

1984
Trafileria Roda & C becomes Rodacciai company

Rodacciai was born in Pusiano (Como) in 1956, when Trafileria 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 Trafileria 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).
Trasparency, 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 Inodixables

1995-2005

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

2007-2016

Investments for production expansion

TODAY

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

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.

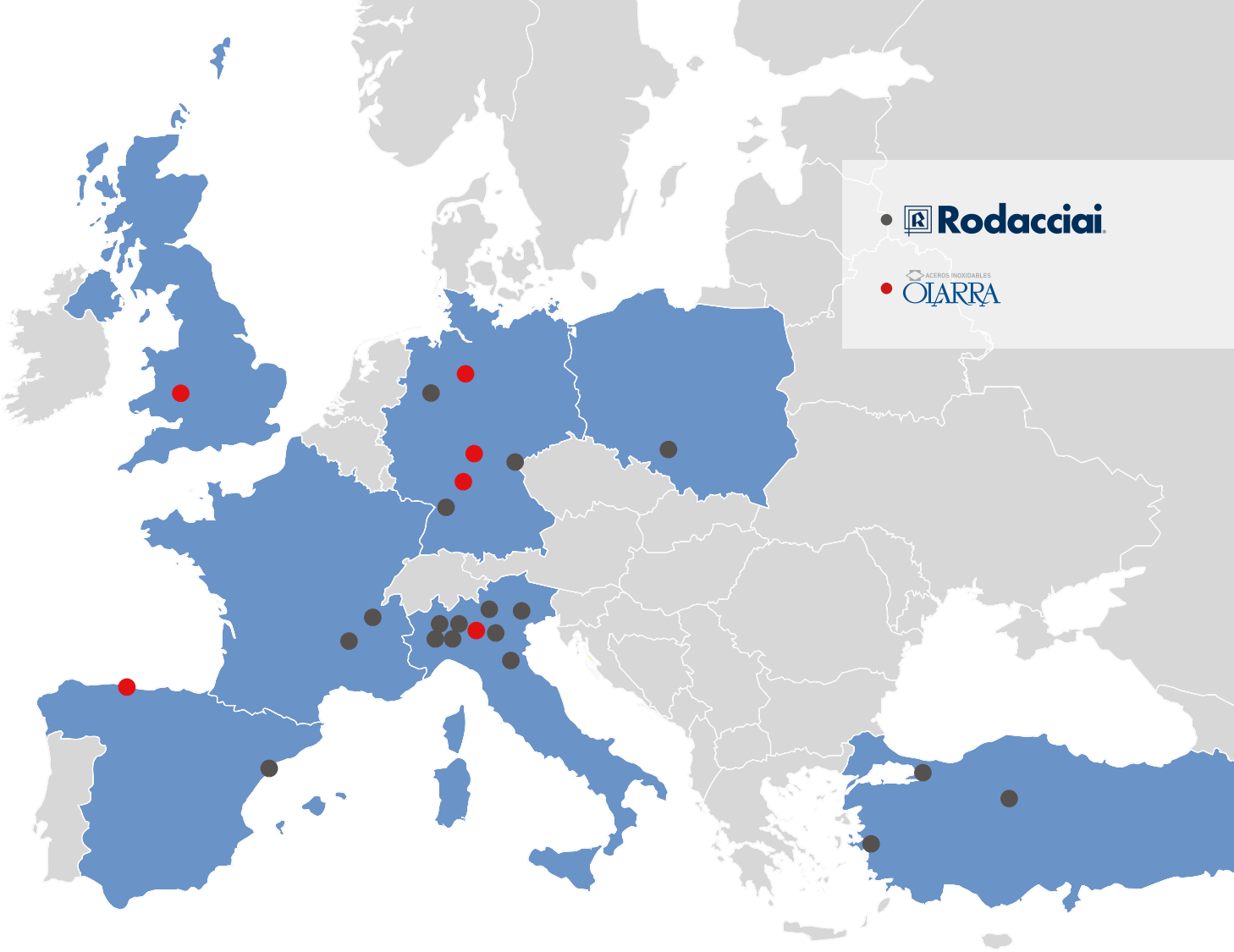
In the continuous development of its Quality Policy, Rodacciai, through its production lines, is able to comply with all the necessary certifications for its products.

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.



8 covered nations

27 distribution centres

EUROPE

Rodacciai
Country: Italy
N° of distribution centres: 6
Cities: Bosisio Parini, Torino, Bergamo, 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

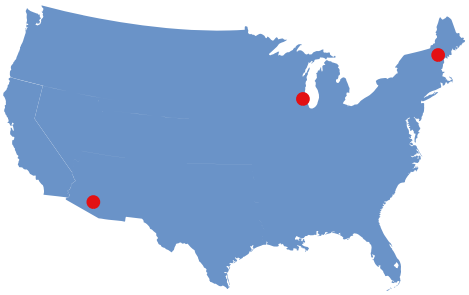
CESI
Country: Italy
N° of distribution centres: 1
Cities: Piacenza

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

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

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

USA



OLARRA - Italia
Country: Italy
N° of distribution centres: 1
Cities: Brescia

OLARRA 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

SUSTAINABILITY

BUILDING A LONG-LASTING FUTURE

"SUSTAINABILITY', A STRATEGIC ELEMENT OF RODACCIAI

Rodacciai has proudly established its three fundamental pillars, drawing inspiration also from the United Nations' 2030 Sustainable Development Goals (SDGs): people, planet, and performance. These cornerstones reflect the company's steadfast commitment to sustainability, social responsibility, and excellence.

PEOPLE

At Rodacciai, creating a dynamic and empowering work environment full of talented individuals is our priority. Our mission is to inspire and engage professionals, fostering a culture where people are not only enticed to join us but also feel deeply motivated to stay and grow with the company for years to come.

PLANET

Rodacciai considers environmental preservation to be a pillar of its production activities and an integral component of its ambitious growth objectives. Rodacciai also places strong emphasis on energy efficiency, viewing these efforts as pivotal to its decarbonization goals. This unwavering commitment reflects the company's determination to align its progress with sustainability at every level.

PERFORMANCE

Rodacciai focuses on optimizing production processes and improving product quality to ensure sustainable progress and superior results. By integrating market signals, stakeholder feedback, and international development policies, the company strengthens its stability and business continuity while upholding responsible governance and ESG principles for ethical and sustainable growth.

2030

PEOPLE

Rodacciai stands out as a virtuous example of social commitment and sustainability through a series of initiatives aimed at promoting the culture of merit, professional development, solidarity, and inclusion.

The company operates with a long-term vision, striving to create a positive impact for local communities, institutions, schools, and the most vulnerable sectors of society, using education, training, and cultural support as key tools for transformation.

One of the pillars of its commitment is the promotion of the culture of merit through the "Giuseppe Roda" Scholarships, rewarding the most deserving students from local schools and universities, with the aim of encouraging excellence in studies and fostering social empowerment. The scholarships are awarded at local institutions and non-profit organizations, strengthening the bond between the company and the territory.

The Rodacciai Academy and related initiatives, such as Academy Road PM in collaboration with RoadJob, represent an important step forward in the professional (re)integration of unemployed and precarious youth. Thanks to qualifying training courses, qualification and requalification activities, and partnerships with local companies, schools, and universities, these projects support the future employment prospects of younger generations.

Rodacciai is also committed to promoting STEM disciplines and technical excellence. Through the HR Excellence project, internship activities, contests, and company visits are offered to students to bring them closer to technical professions and to encourage a corporate culture of excellence.

A notable initiative is the participation in the SIfaSTEM roundtable, aimed at overcoming gender prejudices in scientific and technological subjects and promoting leadership roles in STEM disciplines among female students.

In line with its commitment to innovation and sustainability, the company collaborated on projects such as the Innovation Day to stimulate a critical mindset in young people regarding the use of digital technologies.

Additionally, it supported the first Higher Technical Education and Training (IFTS) course in Italy focused on steel processing, facilitating the employment of trainees through apprenticeships.

The tangible economic support to communities during emergencies caused by natural disasters or similar situations also reflects Rodacciai's commitment to human values. This approach underlines that the company does not limit its efforts to its local context but extends its solidarity to broader realities, responding effectively and promptly to emerging needs.

At the same time, attention to employee well-being is a cornerstone of the company's philosophy.

The HEART and HEALTH initiative represents a concrete commitment to improving the quality of life of its personnel, offering cardiovascular health monitoring to employees over 45.

This is complemented by innovative policies, such as additions to the National Collective Labour Agreement (CCNL), ensuring the opportunity to take paid leaves for personal or family health reasons, proving genuine care for individual and family well-being.

In summary, Rodacciai's commitment to social sustainability is evident in its continuous investment in education, training, and inclusion, but, above all, in its consistent focus on people: fostering the growth and well-being of communities, as well as its own employees.

These initiatives not only reflect the company's values but represent also a model for a fairer, more innovative, and more supportive future.

PLANET

Rodacciai considers environmental conservation a fundamental pillar of its production activities and growth objectives.

The company is fully committed to continuously monitoring and evaluating its environmental impacts to devise innovative strategies that mitigate and reduce adverse effects. A key element of this approach is the responsible management of raw materials: by predominantly using steels sourced from scrap metal within its supply chain—scrap that can be re-melted without any loss of properties—Rodacciai is steadily reducing its reliance on virgin raw materials, whose extraction is highly impactful. **Waste management** is an integral part of the group's sustainability philosophy. In line with circular economy principles, Rodacciai has implemented projects aimed at the valorization, where permissible, of industrial by-products, thereby reducing the volume of waste destined for disposal.

These efforts reflect the company's ongoing commitment to improving and optimizing resources.

Water resource management plays a crucial role in Rodacciai's environmental strategy. The company diligently monitors water consumption and has equipped its facilities with closed-loop systems that incorporate purification and water recovery processes. Within regulatory and technological limits, it also preserves water consumption from the aqueduct, allocating groundwater for production purposes.

Equally important is the attention given to controlling pollutant emissions.

Through monitoring plans and the adoption of appropriate technological solutions, Rodacciai ensures that atmospheric emissions remain under control, guaranteeing that its operations comply with environmental standards and contribute to a healthier ecosystem.

Energy consumption is addressed with the same level of commitment.

The company focuses on both the nature and quantity of energy used, enhancing the efficiency of production processes and evaluating sourcing from renewable energy sources.

This commitment materializes through the technological modernization of facilities, the limitation of energy waste, and the optimization of operational processes, whose results are documented via an automated performance monitoring system. These measures culminate in the decarbonization plan with targets for 2030, guiding the company towards a reduced environmental impact linked to its production processes.

These integrated initiatives in the management of raw materials, water, waste, emissions, and energy not only improve operational resilience but also underscore Rodacciai's commitment to environmental stewardship and sustainable growth.

PERFORMANCES

Rodacciai is deeply committed to the optimization of production processes and the enhancement of product quality, ensuring sustainable progress and superior results across all operations.

These principles, coupled with the incorporation of market signals, stakeholder feedback, and adherence to international development policies, are essential to ensuring business continuity and strengthening the company's stability.

This comprehensive approach reflects Rodacciai's dedication to responsible governance and alignment with Environmental, Social, and Governance (ESG) standards, reinforcing its commitment to sustainable growth and ethical business practices. To support these goals, the company places a strong emphasis on strategic business planning, including the development of comprehensive multi-year growth plans. These plans serve as a roadmap for achieving long-term objectives while adapting to evolving market conditions and global trends.

Rodacciai also prioritizes the measurement and monitoring of its performance through the implementation of Key Performance Indicators (KPIs).

This system enables the company to track progress, ensure transparency, and drive continuous improvement across all areas of its operations, further reinforcing its role as a leader in sustainable and resilient business practices.

Rodacciai

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