Industeel

ArcelorMittal

Stainless steels for the fertilizers industry

A wide range of steel solutions to fit your requirements in the fertilizers industry

More than 150 years of experience
of melting, casting, rolling and finishing special steel plates.

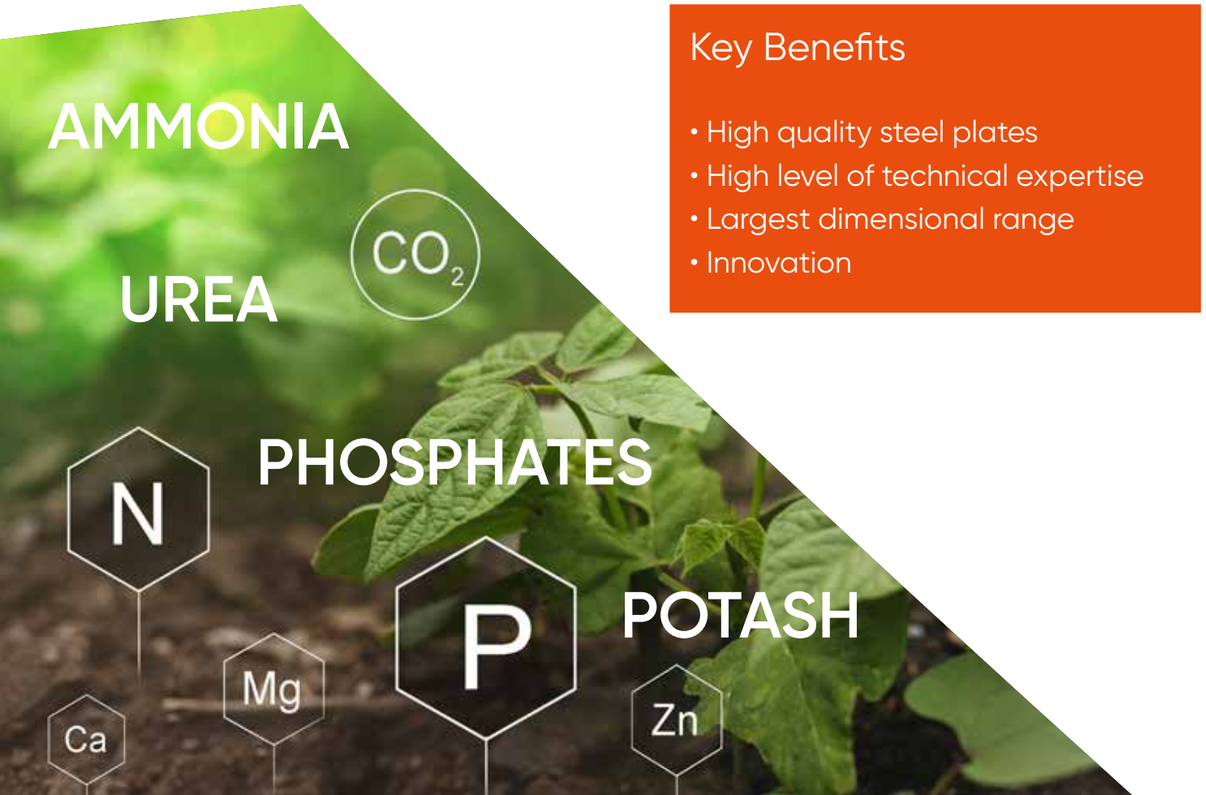
Technical support
for material selection and fabrication.

The largest size
range of plate products.

Prefabrication
forming, bevelling, bending, painting, cutting.

R&D
fully dedicated to development and optimization of Industeel products for your business.

Certified
to all major certification and quality systems.



Key Benefits

- High quality steel plates
- High level of technical expertise
- Largest dimensional range
- Innovation

Leading producer of high quality steels

Industeel is specialized in the production of hot rolled as well as forged steel plates, ingots and formed pieces, with the largest dimensional range worldwide.

Industeel offers a complete range of high quality steel grades designed to meet the most severe customer specifications.

Industeel regroups 5 production facilities rich with a long tradition of metallurgical know-how and different product specialities.

Largest dimensional range worldwide

CHARLEROI

Thickness: 5 - 175 mm - Width: up to 4.000 mm
Weight: up to 20 tonnes

LE CREUSOT

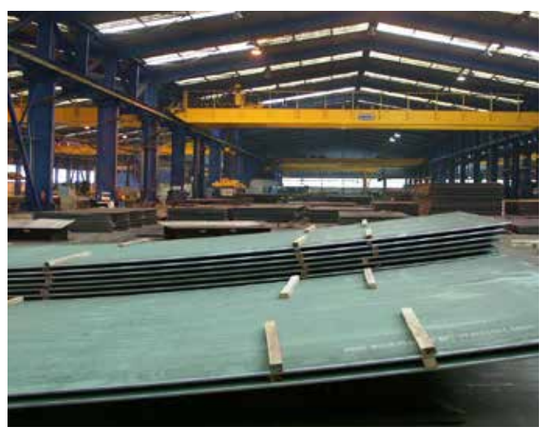
Thickness: 4 - 180 mm - Width: up to 3.100 mm
Weight: up to 20 tonnes

CHÂTEAUNEUF

Thickness: 80 - 1200 mm - Width: up to 4.300 mm
Weight: up to 80 tonnes

Product and application innovation is assured by the proximity to its global customer base via a dedicated worldwide sales network.

All our products are submitted to the most stringent internal and external controls, but also our quality assurance system is approved by the largest international certifying authorities, a guarantee of reproducibility and reliability for our customers.



Our expertise

First-class producer of stainless steel and nickel based alloy plates for corrosive applications

With over 150 years of experience, the Industeel name stands for high performance steel at its best.

Careful selection of raw materials to produce high purity steel melted by electric arc furnace.

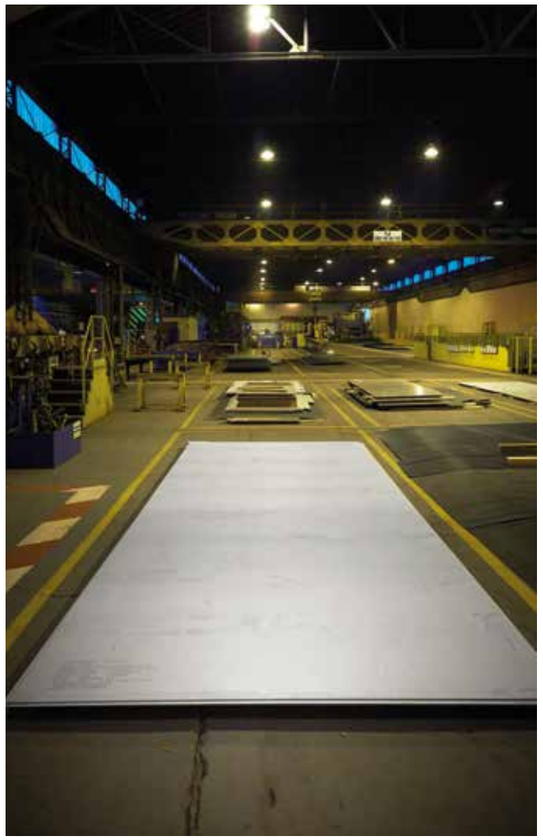
Fine tuned secondary metallurgy, vacuum and special degassing processes for high cleanliness steels.

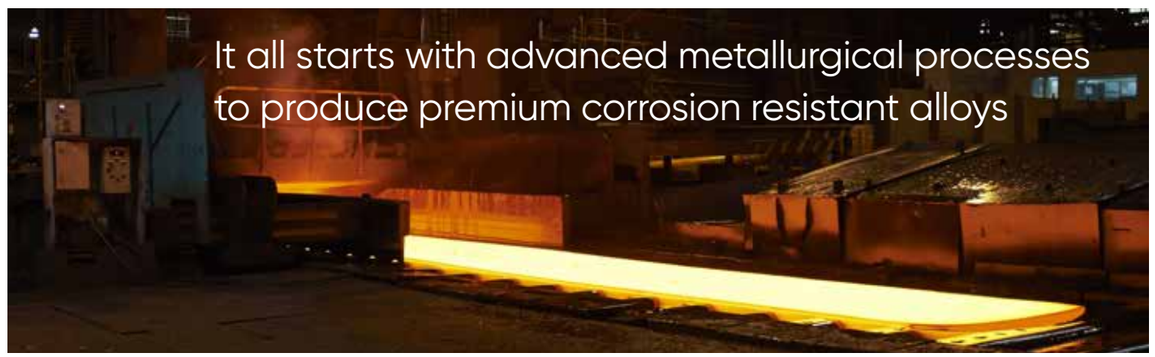
Continuous casting or bottom-poured ingot programs and latest industrial techniques.

Computer controlled high plate rolling mills.

Automatic quenching devices and high precision tempering furnaces to create homogeneous hardness and microstructure through the cross section.

As a result, materials with uniform properties, providing consistent performance in service.





Urea

The corrosion risks in urea production plants are linked to the presence of ammonium carbamate associated to high temperature and high pressure

Special austenitic stainless steels

Industeel has a dedicated offer of special austenitic stainless steels to resist in urea-carbamate environments

Technical characteristics

- Optimized chemical composition with low residual elements (phosphorus, sulfur, silicon)
- Fully austenitic microstructure
- Improved corrosion resistance compared to conventional grades
- Good weldability

Grade	UNS	EN	C max	Cr	Ni	Mo	N
UREA™ 316L	S31603	1.4435	0.03	18	13.5	2.6	-
UREA™ 310MoLN (prev 25-22-2)	S31050	1.4466	0.02	25	22	2.1	0.12

High alloy duplex stainless steels

Safurex® *(1)* is a highly corrosion-resistant material developed for the urea process, especially for the severe conditions encountered in strippers. This grade provides a good resistance to carbamate solutions even with little or no oxygen. This material is produced in the plate form by Industeel under the license from Alleima.
The super-duplex UR™ 2507 can also be a suitable alloy for less severe urea-carbamate environments.

Technical characteristics

- Corrosion resistance in urea-carbamate environments
- Excellent resistance to stress corrosion cracking
- Excellent resistance to intergranular corrosion
- High mechanical properties
- Good weldability (welding guideline available upon request)

Grade	UNS	EN	C max	Cr	Ni	Mo	N
Safurex®	S32906	1.4477	0.03	29	6.5	2.3	0.35
UR™ 2507	S32750	1.4410	0.03	25	7	3.5	0.27

(1) Produced under Alleima's license, for more information www.alleima.com

Phosphates

Corrosive environments are generated during phosphoric acid production because of sulfuric acid addition associated to the presence of aggressive species and temperature

Phosphoric acid production

Industeel has a dedicated offer to fit the conditions encountered in phosphoric acid production units
Guidance for material selection can be provided by our research center as a function of the operating conditions

Grade	UNS	EN	C max	Cr	Ni	Mo	N	Other
UR™ 31	N08031	1.4562	0.03	26.5	31	6.3	0.2	-
UR™ 2507Cu	S32520 S32550	1.4507	0.03	25	7	3.5	0.23	1.5 Cu
UR™ 28	N08028	1.4563	0.03	27	31	3.5	-	1 Cu
UR™ 904L	N08904	1.4539	0.03	20	24	4	0.1	1.5 Cu

Sulfuric acid production

Highly concentrated hot sulfuric acid can be very corrosive towards standard stainless steels

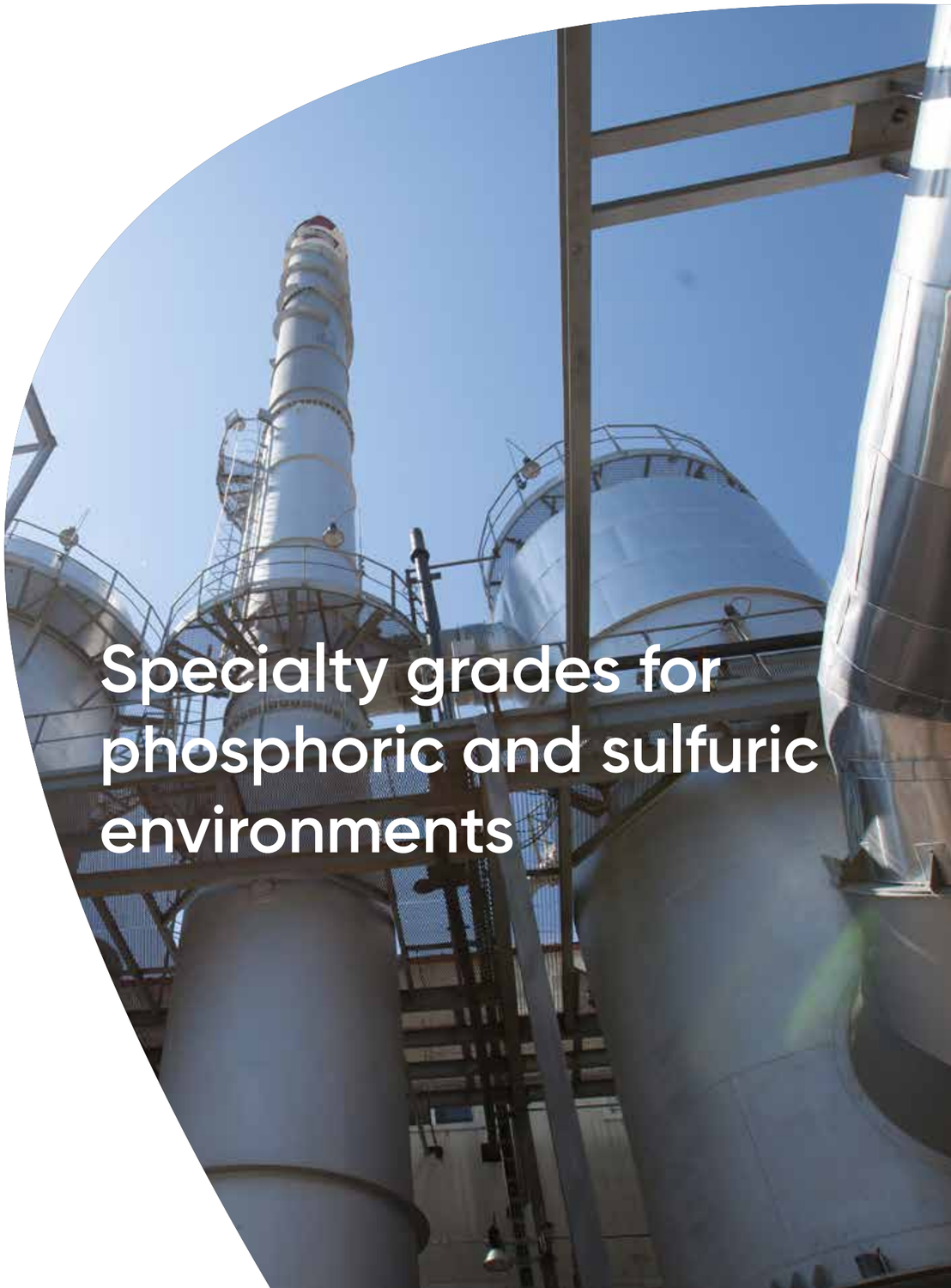
UR™ 32615 has been developed to provide a superior corrosion resistance in highly concentrated hot sulfuric acid

Technical characteristics

- 5% silicon to provide an enhanced corrosion resistance in sulfuric acid
- Good mechanical properties
- Good weldability
- Also resistant in concentrated nitric acid

Grade	UNS	EN	C max	Cr	Ni	Mo	Other
UR™ 32615	S32615	-	0.015	17	19.5	0.4	5 Si

For higher temperatures (>150°C), grades are available from Industeel's portfolio. Please consult.



Specialty grades for phosphoric and sulfuric environments

Ammonia - nitric acid

Ammonium nitrate is produced by reaction of ammonia with nitric acid. Industeel offers a full range of grades dedicated to nitric acid service

Dedicated alloys for high temperature and/or high concentration of nitric acid

UR™ 16, a 304L type grade with extra low carbon, sulfur, phosphorus and silicon, and high nickel developed for high temperature nitric acid up to 40% concentration

UR™ 65, higher chromium and nickel to resist in hot nitric acid up to 90% concentration

UR™ S1, with 4% silicon addition, dedicated to highly concentrated nitric media

Grade	UNS	EN	C max	Cr	Ni	Mo	N	Other
UR™ 16	304L NAG	-	0.015	18.5	12	-	-	-
UR™ 65	301L NAG	1.4335	0.015	25	21	-	-	-
UR™ S1	S30600	1.4361	0.015	17	14.5	-	-	4 Si

The austenitic 304L and the lean duplex UR™ 2202 can be used over a wide range of nitric acid concentration and temperature

304L can be used up to 60% nitric acid at the atmospheric boiling point

The duplex UR™ 2202 has the same domain of use as 304L in nitric acid, and may allow a significant reduction in wall thickness due to the additional strength

Grade	UNS	EN	C max	Cr	Ni	Mo	N	Other
UR™ 2202	S32202	1.4062	0.03	22	2	-	0.2	1.3 Mn
304L	S30403	1.4306	0.03	18	10	-	-	-

Potash

The environments encountered in potash plants can be very corrosive because of the concentrated brines and temperatures

Dedicated alloys for concentrated chloride brines

Super-austenitic stainless steels

Grade	UNS	EN	C max	Cr	Ni	Mo	N	Other	PREN* min
UR™ 31	N08031	1.4562	0.03	26.5	31	6.3	0.2	-	48
UR™ 4565	S34565	1.4565	0.03	24	17	4.5	0.45	4.5 Mn	46
UR™ 367	N08367	-	0.03	20	24.5	6	0.2	-	43
UR™ 254	S31254	1.4547	0.03	20	18	6	0.2	0.7 Cu	43
UR™ 28	N08028	1.4563	0.03	27	31	3.5	-	1 Cu	39
UR™ 904L	N08904	1.4539	0.03	20	24	4	0.1	1.5 Cu	35

Super-duplex stainless steels

Grade	UNS	EN	C max	Cr	Ni	Mo	N	Other	PREN* min
UR™ 2507	S32750	1.4410	0.03	25	7	3.5	0.27	-	41
UR™ 2507W	S32760	1.4501	0.03	25	7	3.5	0.23	0.6 Cu, 0.6 W	41
UR™ 2507Cu	S32520 S32550	1.4507	0.03	25	7	3.5	0.23	1.5 Cu	41

Duplex stainless steels

Grade	UNS	EN	C max	Cr	Ni	Mo	N	Other	PREN* min
UR™ 2205	S31803	1.4462	0.03	22	5.3	2.7	0.18	-	> 33
UR™ 2205Mo	S32205	1.4462	0.03	22.5	5.5	3.1	0.18	-	35/36

** PREN = Pitting Resistance Equivalent Number = %Cr + 3.3%Mo + 16%N*

Storage tanks

Duplex stainless steels offer excellent mechanical properties combined with good corrosion resistance over a broad range of environments

Properties

- High mechanical strength (> 400 MPa, > 58 ksi)
- Usual temperature range : -50 to 300°C (-58 to 572°F)
- Similar thermal expansion compared to carbon steels

Fabrication

- Good weldability, a welding guideline is available upon request
- Weld properties are predictable

Corrosion resistance

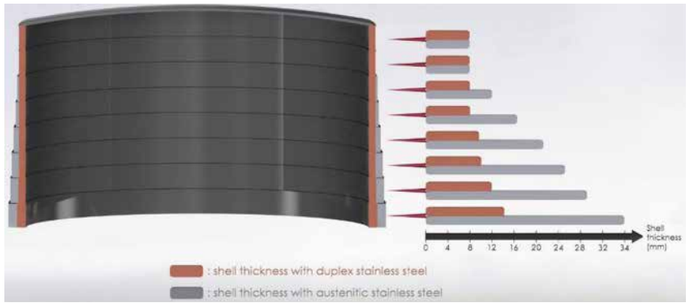
- Wide range of corrosion resistance available
- Lower susceptibility to stress corrosion cracking than austenitics

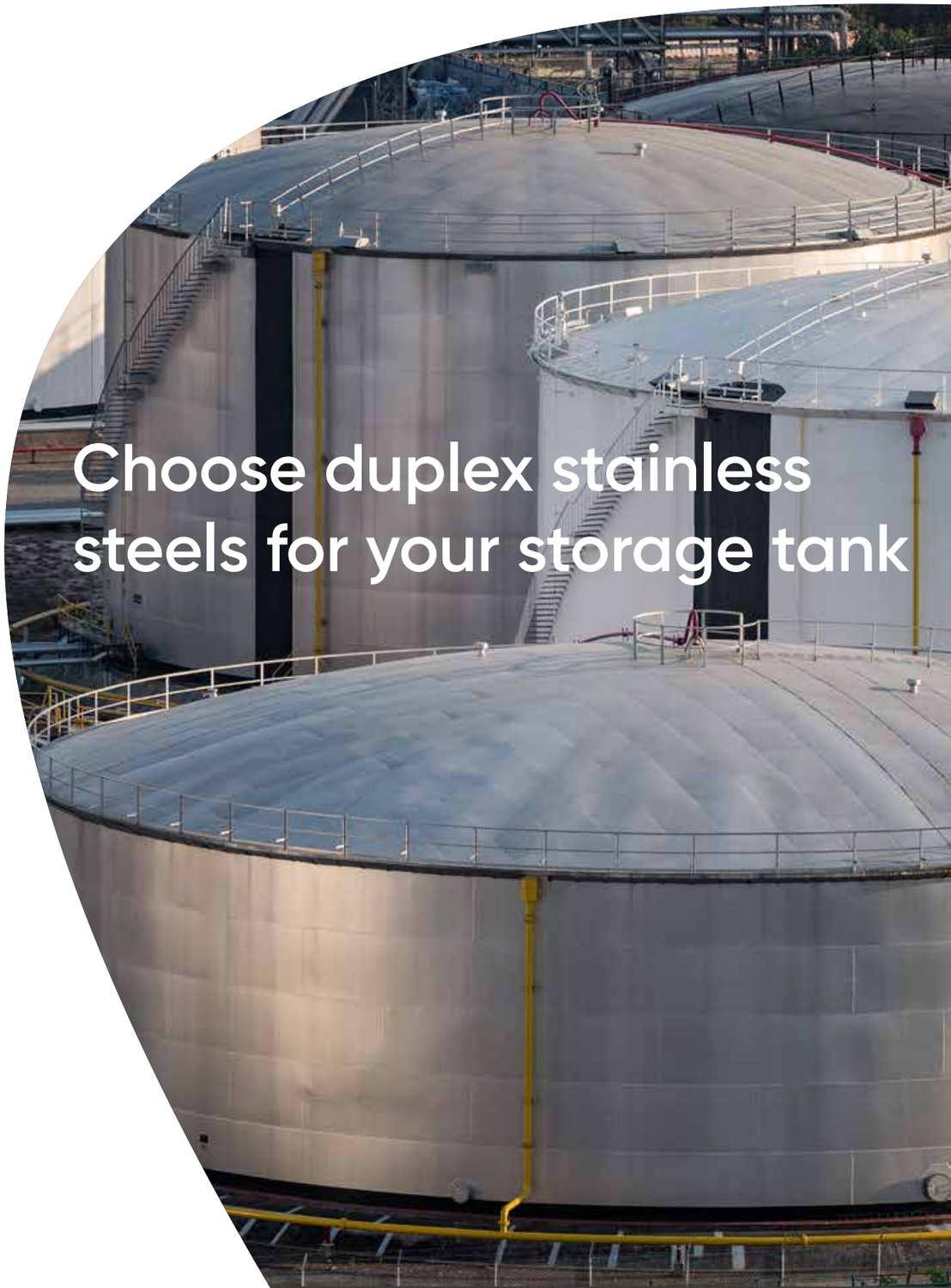
5 reasons to choose duplex for your storage tanks

- The duplex "family" covers a broad range of corrosive environments
- Using duplex grades to design tanks provides reductions in thickness optimizing the total cost compared to other grades
- Using Industeel's wide plates reduces the number of shell courses minimizing welding
- Duplex can be easily welded to carbon steel
- Duplex grades can be machined for beveling in our workshop in Dunkirk

Grade	UNS	EN	C max	Cr	Ni	Mo	N	Other	PREN* min
UR™ 2202	S32202	1.4062	0.03	22	2	-	0.2	1.3 Mn	25
UR™ 2304	S32304	1.4362	0.03	23	4	-	0.14	-	25
UR™ 2205	S31803	1.4462	0.03	22	5.3	2.7	0.18	-	> 33
UR™ 2205Mo	S32205	1.4462	0.03	22.5	5.5	3.1	0.18	-	35/36
UR™ 2507	S32750	1.4410	0.03	25	7	3.5	0.27	-	41

** PREN = Pitting Resistance Equivalent Number = %Cr + 3.3%Mo + 16%N*





Industeel R&D Center (CRMC)

A real centre of innovation, with 50 researchers dedicated to our customers, located in Le Creusot. Industeel's CRMC is a world class research facility with unequalled concentration of high-tech equipment and steel experts

R&D

Each year, half a dozen new products are put on the market thanks to the work of the research center. Over 40 products and process patents from the R&D center are currently in operation.

Innovation

In collaboration with customers, our engineers design new solutions to respond to specific market requirements with innovative products and/or processing methods. With dedicated expert, the research center offers the best vailable expertise in the business.

Technical assistance, cost control

Our team gives you on-field technical assistance to help you gain full advantage of Industeel grades.
During the lifetime of the project, we provide solutions in terms of heat treatment, welding, cutting and forming recommendations and other specific technical issues such as corrosion testing or ballistic testing.

The right steel mastery for your steel solutions

With nearly 200 years of experience in metallurgy, we provide total adaptability, flexibility, zero deviation and a final product fulfilling 100% of your requirements.

With over 2000 men and women entirely dedicated to steel perfection

ArcelorMittal

Smarter steels for people and planet

For more information

Industeel Belgium
Charleroi plant
266 rue de Châtelet
6030 Charleroi
Belgium

Industeel France
Le Creusot plant
56 rue Clemenceau
71201 Le Creusot Cedex
France
sandra.le-manchet@arcelormittal.com

industeel.arcelormittal.com