



ArcelorMittal

Duplex stainless steels



by ArcelorMittal

ArcelorMittal, your key partner

ArcelorMittal is the world leader in the steel industry. Through many of its units, it offers a multitude of effective, innovative and environmentally friendly stainless steel solutions, tailored to meet its customers' expectations.

Plates by Industeel, **flat products** by Stainless Europe and Inox Brazil, **welded tubes** by Tube Europe, **thin strips** by Precision Europe, **wire rods** by Stainless & Nickel Alloys, an alternative source in Duplex range is born. With our mills' expertise of over 20 years and efficient R&D resources, we have achieved your desire in less than 2 years.

Innovation, technical partnership, service

transforming tomorrow

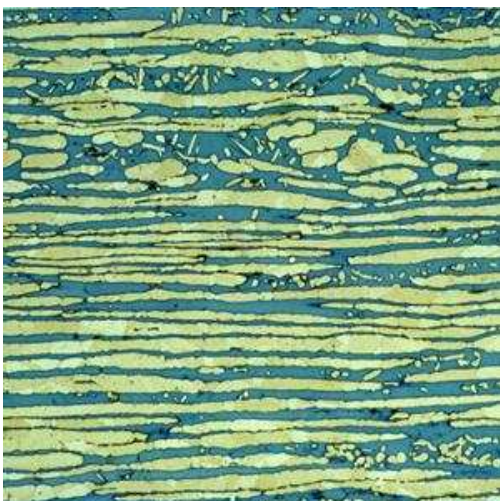
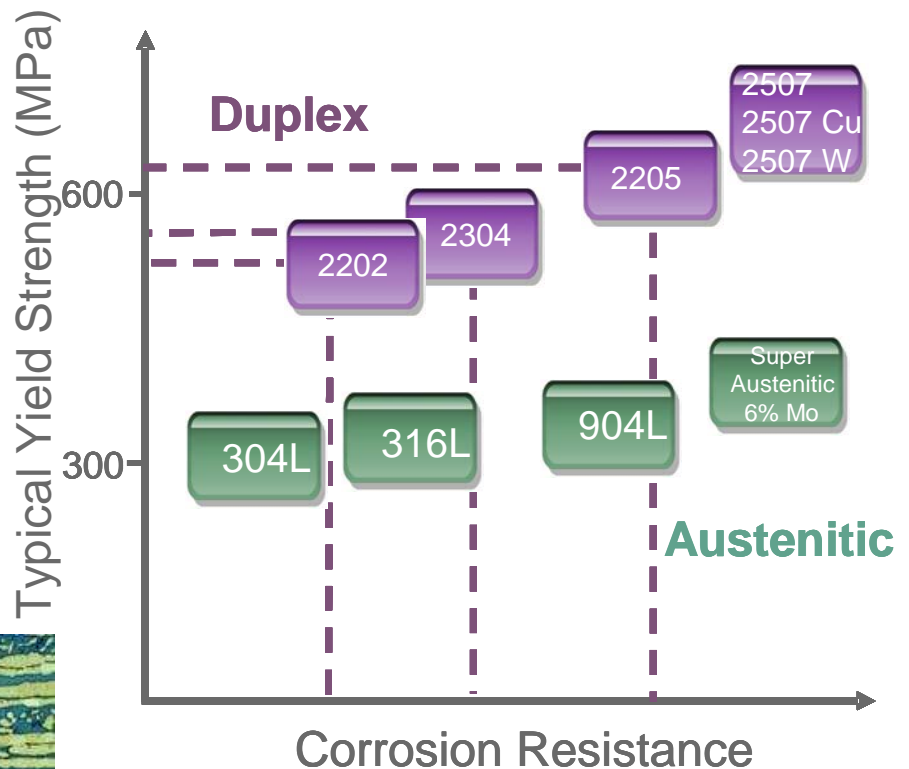
Our Duplex offer, a comprehensive alternative to standard austenitics

Available grades and shapes

	UNS	EN	C	Cr	Ni	Mo	N	Others	PREN*	Plates	Coils	Strips	Tubes
DX2202* UR2202	S32202	4062	<0.03	23	2.5	0.3	0.2		26	x	x		
DX2304 UR2304	S32304	4362	<0.03	23	4.5	0.5	0.1		26	x	x	x	x
DX1803 UR2205	S31803	4462	<0.03	22.5	5.5	2.7	0.18		33/34	x	x	x	x
DX2205 UR2205 Mo	S32205	4462	<0.03	22.5	5.5	3.1	0.18		35/36	x	x	x	x
UR2507	S32750	4410	<0.03	25	6.5	3.6	0.26		≥ 40	x			
UR2507 Cu	S32520	4507	<0.03	25	6.5	3.5	0.25	1<Cu<2	≥ 40	x			
UR2507 W	S32760	4501	<0.03	25	7	3.4	0.23	Cu 0.8-W 0.8	≥ 40	x			

*DX2202/UR2202 is patented by ArcelorMittal Industeel and Ugitech (long products),.

Duplex solutions can replace standard austenitics for most service environments.

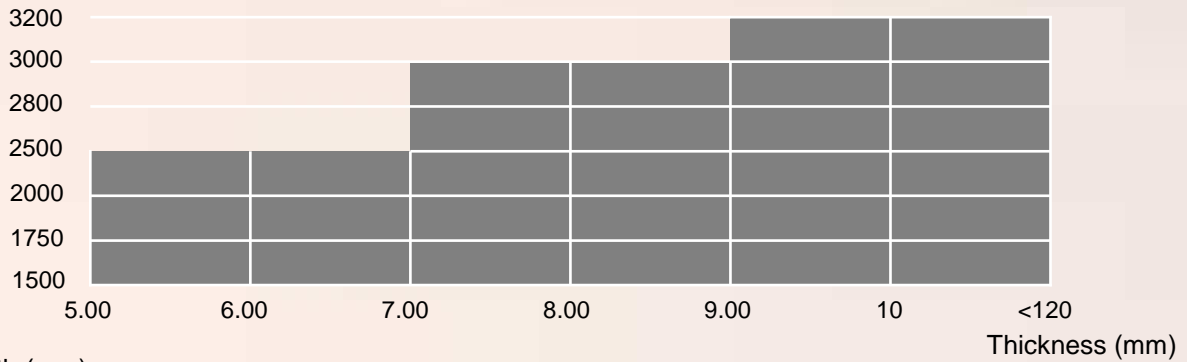


Thanks to their dual phase (ferrite + austenite) structure, their mechanical properties are twice as high as those of austenitics.

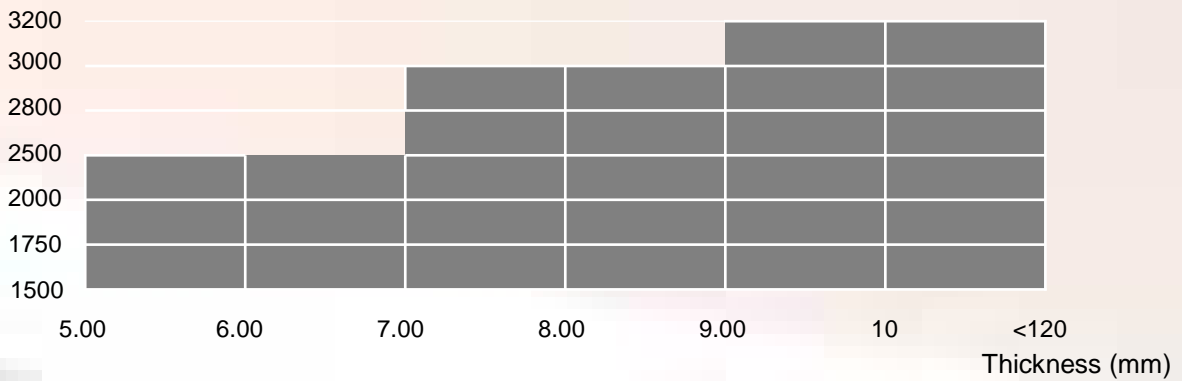
Dimensional program in plates

Hot rolled ASTM/EN 1D

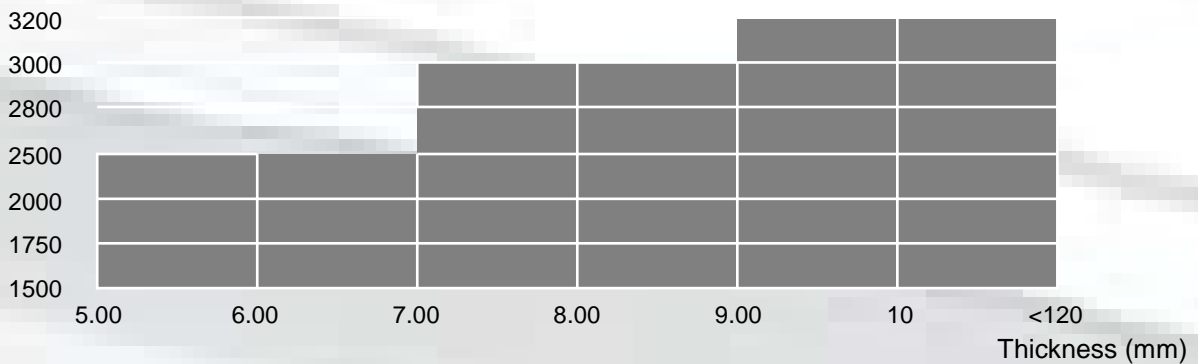
Width (mm) Industeel 2507/2507Cu/2507W



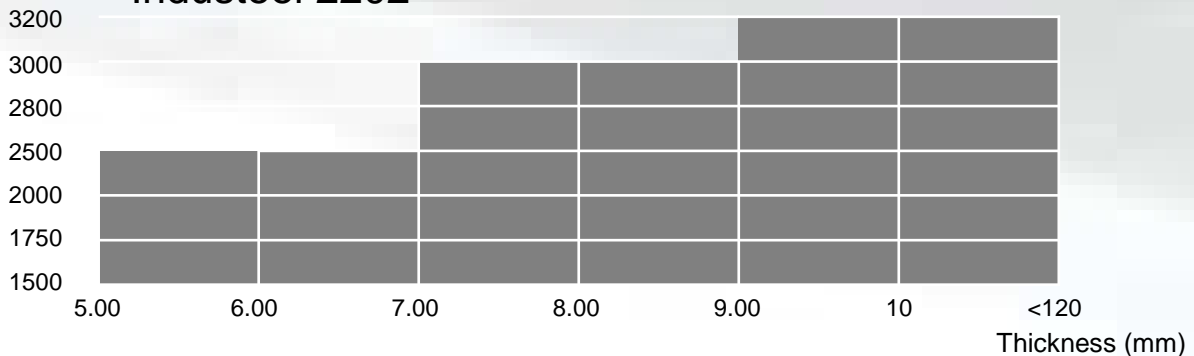
Width (mm) Industeel 2205



Width (mm) Industeel 2304



Width (mm) Industeel 2202

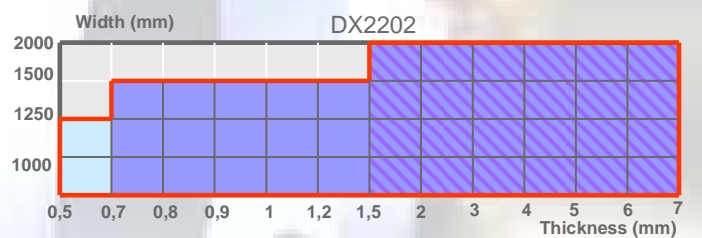
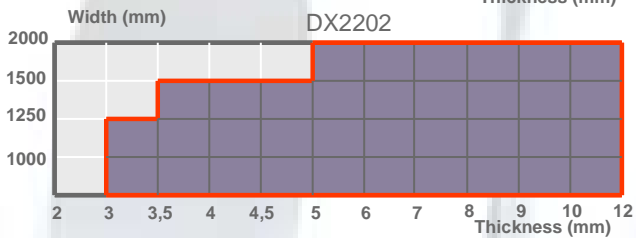
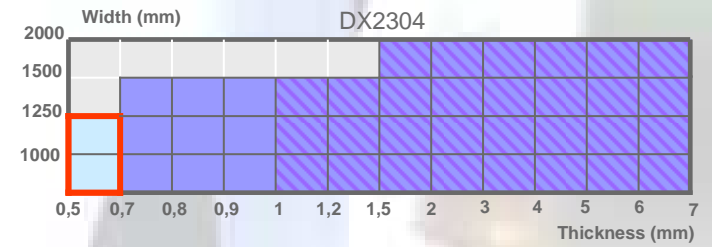
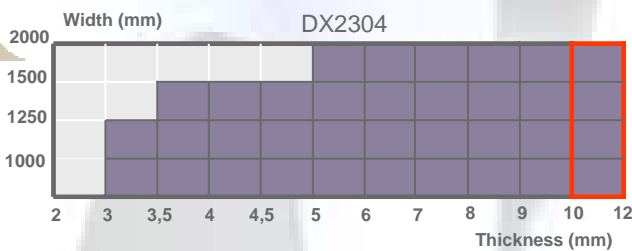
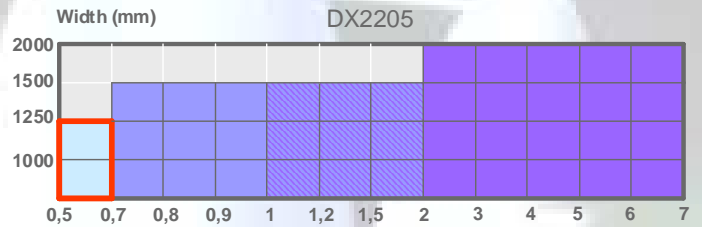
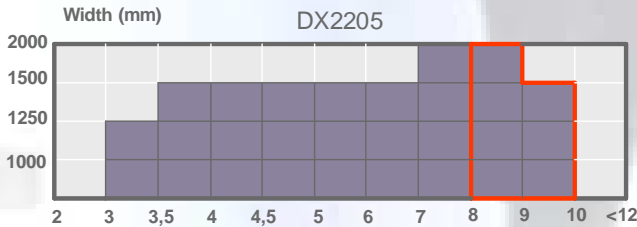


Dimensional program in coils

• **Stainless Europe** is the group's worldwide producer of coils with a large and attractive range of grades and dimensions

Hot rolled ASTM N°1 / EN 1D

Cold rolled : 2B or 2E



Consult us

2B or BA finishing

2E or 2B finishing

2B finishing

Coil weight (Kg.mm)	1000	1300	1500	2000
CR	15,5	15,5	15,5	12,5
HRAP	16,5	16,5	16,5	13,5

Sheets from coils (CMP) are also available with length up to 10000mm

Special finishes (2G, 2J) are possible on request

•Inox Brasil

developed an offer in coils, sheets and plates for its local market.

Sheets from coils (CMP) are also available with length up to 6100mm

Grade	Product	Thickness (mm)	Width (mm)	Finish
2205	CR Coil and sheet	1.2 to 3.0	1300	2D/2B
	HRAP Coil	3.5 to 6.0	1300	N°1 (1D)
	HRAP Sheet	3.5 to 8.0	1300	
	CMP	9.0 to 10.0	1300	N°1 (1D)
	CMP	12.7 to 50.8	1540	
2304	CR Coil and sheet	1.2 to 3.0	1300	2D/2B
	HRAP Coil	3.5 to 6.0	1300	N°1 (1D)
	HRAP Sheet	3.5 to 8.0	1300	
	CMP	9.0 to 12.0	1300	N°1 (1D)
	CMP	12.7 to 50.8	1300	

Dimensional program in wire rods

Diameter from 5.5 (0.204'') to 12.5 mm (0.479'')

Grades and Applications

TRADE NAMES	CHEMICAL ANALYSIS										STANDARD
	C	Si	Mn	Ni	Cr	Mo	Cu	S	P	Others	AWS
Phyweld 312	0.14	0.30 0.55	1.1 2.4	8.7 10.3	28.8 31.2	0.75	0.75	0.020	0.030		AWS SFA 5.9 ER 312 UNS S31380

Used for welding duplex steel with high mechanical properties. Offers a very large application field as welding material of tools steels, springs steels, high temperature resistant steels or other duplex steels. Weld metal: very good wear and wet corrosion resistance such as in the sulfuric environment of the paper industry.

Phyweld 45N	0.030	1.00	2.00	8.00 10.0	22.0 24.0	2.5 3.5		0.015	0.030	N 0.10 / 0.20	AWS SFA 5.9 ER 2209 UNS S39209
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Used for welding over-alloyed duplex steel (initially for welding Uranus 45N). Weld metal: due to its high Mo and Cr contents, also used for its very good resistance to pitting and stress corrosion cracking in environments such as chloride. Chemical, acid transports, offshore, paper industries...

Phyweld 52N	0.030	0.70	2.00	6.00 7.50	24.0 26.0	3.00 4.00	1.00 2.50	0.015	0.035	N 0.20 / 0.30	AWS SFA 5.9 ER2553 UNS S39553
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Used for welding over-alloyed duplex steel and also for joining them with carbon steels or low alloyed steels. See water systems, production and transport of phosphoric acid, paper industry, offshore or depollution industries...

Phyweld 25-9-4	0.030	1.00	2.50	8.00 10.5	24.0 27.0	2.50 4.50	1.50	0.020	0.030	N 0.20 / 0.30 W < 1.0	AWS SFA 5.9 ER2594
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Used for welding all duplex and superduplex steels when the highest possible corrosion resistance is required. Weld metal: excellent resistance to intergranular corrosion, pitting corrosion and stress corrosion cracking.

Dimensional program in welded tubes

As part of ArcelorMittal, Stainless Tubes Europe gives us access to the full range of Duplex grades on offer.

Stainless Tubes Europe is an expert in annealed tubes with lines featuring inline annealing.

Various lengths can be produced making use high precision cutting tools.

Diameter min (mm)	Diameter max (mm)	Min thickness	Max thickness
6	10	0.5	1
12	15	0.5	1.5
16	20	0.5	2
21.3	30	0.6	2.6
32	40	0.6	3.2
41	45	0.8	3.2
48.3	58	1.2	3.2
60	63.5	1.2	4
76.1	114.3	1.2	5



Surface Finishes and post-weld treatments

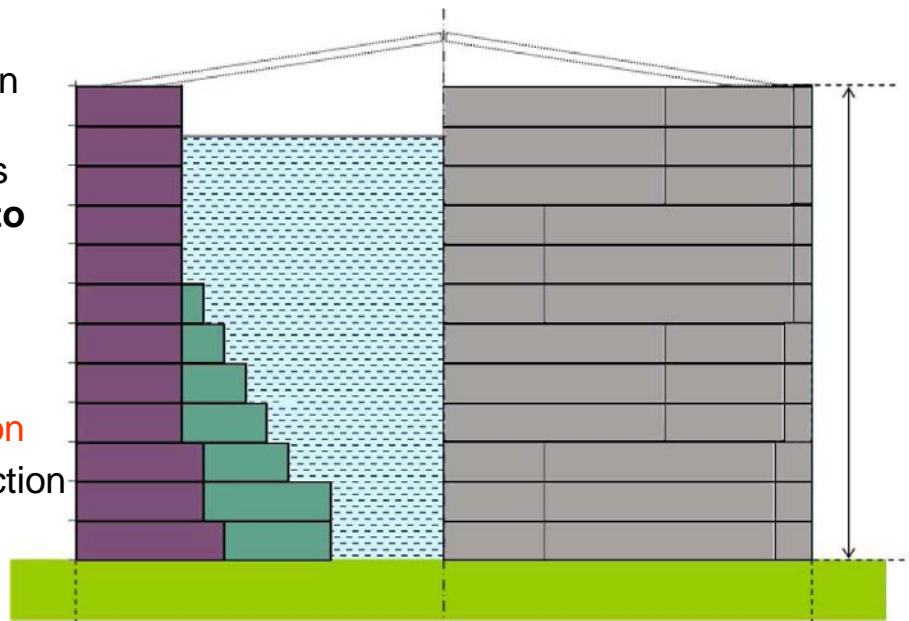
- Surface Finishes (Post Welding)
 - Pickled
 - Brushed
 - Polished (220, 320, 400, 600)
- Post-weld treatments
 - Bright annealed
 - Inside bead rolled

Please consult us for your specific requirements

Duplex grades exhibit weight saving potential

For **comparable** corrosion resistance, the Yield strength is about **twice** as high. Opportunities exist to **save weight** for tanks or equipments under static loading.

- 28% of weight reduction through a thickness reduction
- Additional reduction in welding cost

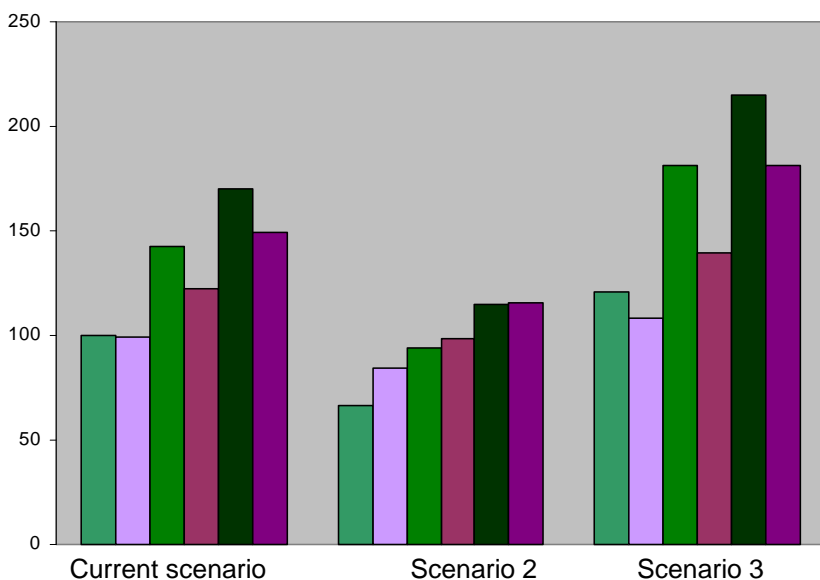


Sheet thickness calculated according to the SHELL DESIGN API 650 Standard
Case of a 14m Ø - 24m high silo filled with water

2202
48 tonnes

VS

304
67 tonnes



Base 100= 304 2mm coil 2B full price current scenario



Depending on alloy pricing, the choice of duplex may be more cost-effective even before taking in account any weight saving.

	Current Scenario	Scenario 2	Scenario 3
Cr (\$/Lbs)	1,3	0,9	1,6
Ni (\$/T)	21 000	10 000	30 000
Mo (\$/Kg)	36	25	60
Fe (€/T)	300	200	350
€/€	1,3	1,25	1,4

A few achievements



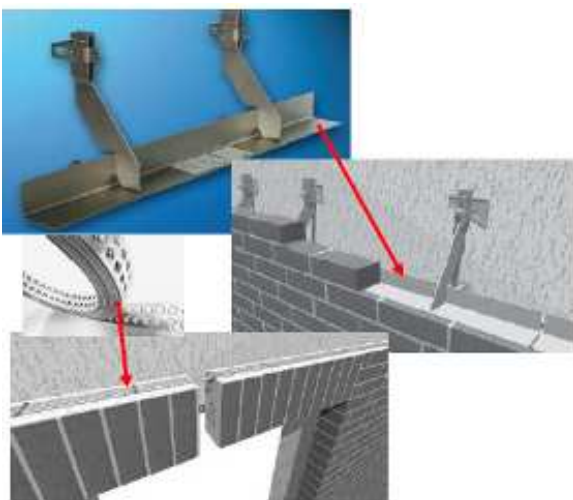
Chemical tankers in 2205



Machinery to dye (colour) textile in 2304



Digester in 2205



Masonry support in 2304



Desalination plant in 2205

A few achievements



Flue gas desulfurization unit in 2205



First 2205 chemical tanker built in China



Bridge arches in construction in 2304



Arco Ponte Malizia - Siena in 2304



Les Braves – Omaha Beach in 2205 and 316L

Your contacts



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Complementary products outside of the ArcelorMittal' group:

Long products (in particular in duplex 2202) made by **Ugitech**

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