



UR™ 2205 Arctic

UR™ 2205 Arctic

UR™ 2205 Arctic is a 22% chromium and 6% nickel duplex stainless steel developed to provide an enhanced weldability compared to the standard 2205 material. This grade performs much better than the austenitic 316L in almost all corrosive media. Its yield strength is about twice that of austenitic stainless steels, which may allow the designer to save weight and makes the alloy more cost competitive compared to 316L.

In addition to its enhanced weldability, UR™ 2205 Arctic presents good toughness properties at low temperature (until -100°C (-73°F)), while other duplex stainless steels cannot be used below -50°C (-58°F).

Advantages compared to the standard 2205 duplex stainless steel:

- > **enhanced weldability**
- > **enhanced toughness properties at low temperature**

Advantages compared to standard austenitic stainless steel:

- > **better corrosion resistance**
- > **better mechanical properties**
- > **lower cost**

PROPERTIES

STANDARDS

- > EURONORM: EN 1.4462 X2 Cr Ni Mo N 22 - 5 - 3
- > ASTM: A240 - UNS S31803 / S32205

CHEMICAL ANALYSIS - WEIGHT %

Typical values

C	Cr	Ni	Mo	N
< 0.030	22.5	6	3	.19

Mo content is optimized in the 2.7 - 3.1% range to get the required PREN value (33, 34 or ≥ 35)

$\text{PREN} = [\text{Cr}\%] + 3.3 [\text{Mo}\%] + 16 [\text{N}\%]$

MECHANICAL PROPERTIES

UR™ 2205 Arctic presents the same mechanical strength as the standard 2205 duplex stainless steel.

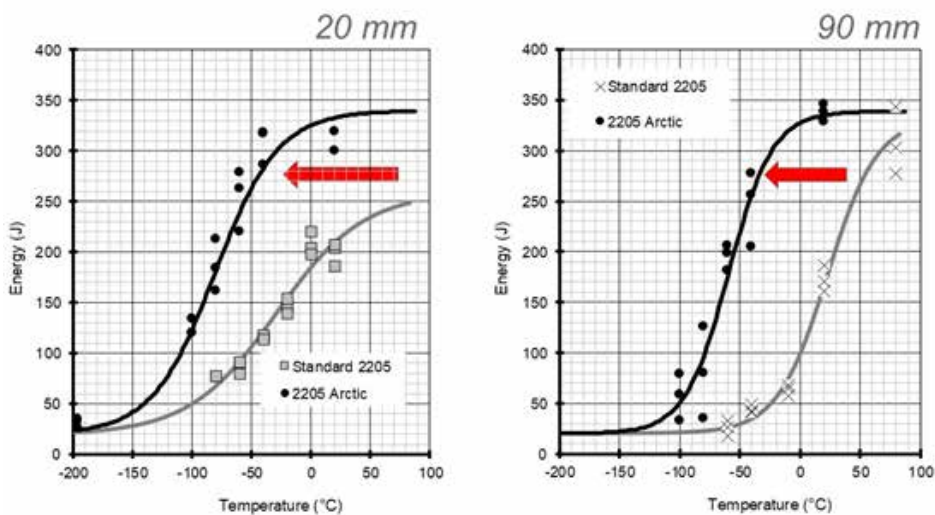
Tensile properties - Minimum values

°C	R _{p0.2} (MPa)	R _{p1.0} (MPa)	R _m (MPa)	°F	YS 0.2% (ksi)	YS 1.0% (ksi)	UTS (ksi)	A/ Elongation (%)
20	460	490	680	68	67	71	98	> 25
50	430	470	660	122	62	68	96	> 25
100	360	400	630	212	52	57	92	> 25
150	340	380	605	302	49	54	88	> 25
200	320	360	590	392	46	52	86	> 25
250	305	345	590	482	44	50	86	> 25
300	290	330	590	572	42	48	86	> 25

Impact strength up to 90 mm thick plates (KV minimum values)

Temperature	- 100°C	- 60°C	+ 20°C	- 148°F	- 76°F	68°F
Single	45 J	100 J	200 J	33ft.lbs	73ft.lbs	147ft.lbs
Average	60 J	120 J	250 J	44 ft.lbs	88 ft.lbs	184 ft.lbs

UR™ 2205 Arctic presents much better toughness properties at low temperatures than the standard 2205 duplex material, even down to -80°C.



CORROSION RESISTANCE

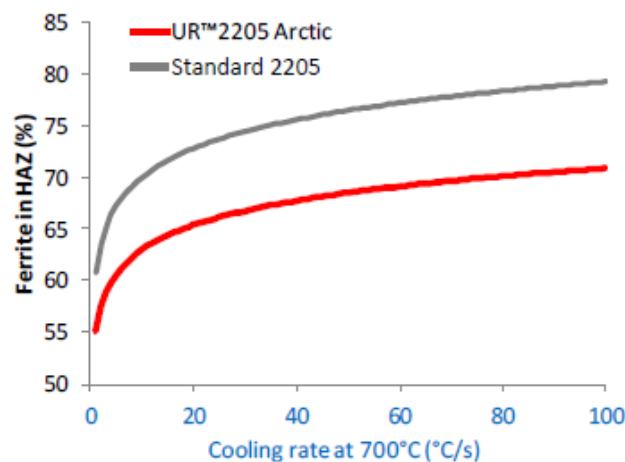
UR™ 2205 Arctic presents the same corrosion resistance as standard 2205 duplex stainless steel in aqueous solutions as well as in sour environments.

WELDABILITY

UR™ 2205 Arctic can be welded using all typical welding processes: GTAW both manual and automatic, PAW, GMAW, SMAW, SAW, FCAW.

As for other duplex stainless steels, preheating and postheating treatments are not recommended. The interpass temperature must be kept below 150°C (300°F) for matching consumables and below 100°C for overalloyed consumables. Welding heat input is not limited by base material. Maximal heat input could be required by welding consumables suppliers.

Duplex stainless steels generally require a strict control of the heat input to avoid a too high ferrite content in the heat affected zone. The advantage of UR™ 2205 Arctic is that the ferrite content is kept below 70% in heat affected zone regardless of the heat input.



UR™ 2205 Arctic can be welded either with the matching filler material (E2209) or with the overalloyed filler material (E2594). For gas processes, when a duplex wire is used a shielding gas with nitrogen addition (2%N₂) is recommended to keep a satisfactory microstructure and appropriate corrosion resistance. For severe toughness requirements at low temperature (below -80°C), other filler materials can be recommended.

Please contact us.

	Homogeneous	Overalloyed (1)
Covered electrodes ASME SFA 5.4	E2209-15 (3) E2209-16 (3) E2209-17 (3)	E2594-15 E2594-16 E2594-17
Rods and wires (2) ASME SFA 5.9	E(R)2209 (3)	E(R)2594
Flux cored wires (2) ASME SFA 5.22	E2209T1-1 (3) E2209T1-4 (3)	E2594T1-1 E2594T1-4

(1) Increased corrosion resistance

(2) Flux / gas are proposed by the filler material supplier depending on filler material chemical composition and application. Welding gas with hydrogen addition is not allowed. It's recommended to add (2-3%) N₂.

(3) Classification specifies N content between 0.08% and 0.20%, but to keep good corrosion resistance and good austenite/ferrite equilibrium, we recommend a minimum content of 0.10% in deposited filler metal.

YOUR CONTACTS

Didier Paul

Tel. +33 6 19 28 29 31

didier.r.paul@arcelormittal.com

<https://industeel.arcelormittal.com>

Industeel Belgium

266, rue de Châtelet

B - 6030 Marchienne-au-Pont

Technical data and information are to the best of our knowledge at the time of printing. However, they may be subject to some slight variations due to our ongoing research programme on steels. Therefore, we suggest that information be verified at time of enquiry or order. Furthermore, in service, real conditions are specific for each application. The data presented here are only for the purpose of description, and considered as guarantees when written formal approval has been delivered by our company. Further information may be obtained from the address opposite.