



Roll-bonded clad plates

Our cost-efficient answer to corrosion

Roll-bonded clad plates are advanced composite materials engineered to provide exceptional corrosion resistance and mechanical strength for demanding applications. These plates consist of a thin layer of corrosion-resistant alloy, metallurgically bonded to a base layer made of high-strength carbon steel. The bonding is created during the hot rolling process under high temperature and high pressure, resulting in an inseparable connection between the two layers.

While the clad layer provides exceptional protection against aggressive media, corrosive chemicals and sour gas, the carbon steel base material offers high strength and superior toughness. This combination leads to significant cost-savings compared to solid CRA plates, making it ideal for economic large-scale projects.

The state-of-the-art production process at voestalpine Grobblech GmbH ensures the highest quality and an excellent surface finish. With the world's largest cladding capacity, a highly automated production line and an extensive portfolio of references and projects, we demonstrate proven performance and reliability even for the most demanding applications.

Convincing advantages

- » Significant cost-savings compared to solid CRA plates
- » Superior corrosion resistance
- » Outstanding quality and tightest tolerances by state-of-the-art manufacturing
- » High strength and toughness of base material for demanding applications
- » Excellent weldability and significant savings on filler material

voestalpine clad plates are also available with a CO₂-reduced footprint in the greentec steel Edition clad, contributing to a further positive CO₂-balance, even on project level.



PREMIUM QUALITY
WITH REDUCED
CARBON FOOTPRINT

Dimensions

Clad material	Total thickness [mm]	Clad thickness [mm]	max. Width [mm]	max. Length [mm]	max. Length Water quenched [mm]	Weight per plate [t]	Area [m ²]
Ferritic and austenitic stainless steel	6 – 150	1.5 – 10	3,800	15,000 *)	12,400 *)	≥ 2 ≤ 20	≥ 6
Nickel alloys 625, 825	6 – 120	1.5 – 10	3,800	15,000 *)	12,400 *)	≥ 2 ≤ 14	≥ 6
Copper alloys	6 – 65	1.5 – 10	3,800	15,000 *)	12,400 *)	≥ 2 ≤ 20	≥ 6

*) Further dimensions upon request

Base materials: Structural steels and pressure vessel steels

According to EN 10025-2, EN 10028-2 and EN 10028-3

Standard	Steel grade	Mechanical properties		
		Yield strength ¹⁾ min. [MPa]	Tensile strength ¹⁾ [MPa]	Comparable ASTM-steel grade
EN 10025-2	S235JR	235	360 – 510	-
	S355JR	355	510 – 680	-
	P235GH	235	360 – 480	A285 GradeC
	P265GH	265	410 – 530	A516 Grade60
	P295GH	295	460 – 580	A516 Grade65
EN 10028-2	P355GH	355	510 – 650	A516 Grade70
	16Mo3	275	440 – 590	-
	20MnMoNi4-5	470	590 – 750	A533 Type B Class2
	13CrMo4-5	300	450 – 600	A387 Grade12 Class2
	10CrMo9-10	310	480 – 630	-
	12CrMo9-10	355	540 – 690	A387 Grade22 Class2
	13CrMoV9-10	455	600 – 780	A542 Type D Class4
EN 10028-3	P275 NH	275	390 – 510	A516 Grade60
	P275 NL1	275	390 – 510	A516 Grade60
	P275 NL2	275	390 – 510	A516 Grade60
	P355 NH	355	490 – 630	A516 Grade70
	P355 NL1	355	490 – 630	A516 Grade70
	P355 NL2	355	490 – 630	A516 Grade70
	P460 NH	460	570 – 730	A572 Grade65
	P460 NL1	460	570 – 730	A572 Grade65
P460 NL2	460	570 – 730	A572 Grade65	

According to ASTM

Standard	Steel grade	Mechanical properties		
		Yield strength ¹⁾ min. [MPa]	Tensile strength ¹⁾ [MPa]	Comparable steel grade of EN 10028
ASTM	A285 GradeC	205	380 – 515	P235GH
	A516 Grade60	220	415 – 550	P275
	A516 Grade65	240	450 – 585	P355
	A516 Grade70	260	485 – 620	P355
	A572 Grade65 Type 1	450	≥ 550	P460
	A204 Grade A	255	450 – 585	16Mo3
	A204 Grade B	275	485 – 620	16Mo3
	A302 Grade B	345	550 – 690	18MnMo4-5
	A533 Type B Class1	345	550 – 690	20MnMoNi4-5
	A533 Type B Class2	485	620 – 795	20MnMoNi4-5
	A387 Grade11 Class2	310	515 – 690	13CrMoSi5-5
	A387 Grade12 Class2	275	450 – 585	13CrMo4-5
	A387 Grade22 Class2	310	515 – 690	12CrMo9-10
	A542 Type D Class4	380	585 – 760	13CrMoV9-10
	A841 Grade A Class1	345	485 – 620	P355

¹⁾ depending on thickness

Base materials: Fitting steels and linepipe steels

According to ASTM, API 5L and DNVGL-ST-F101

Standard	Steel grade	Mechanical properties		
		Yield strength ¹⁾ min. [MPa]	Tensile strength ¹⁾ [MPa]	Comparable steel grade of ASTM / DNVGL / API
ASTM	A106 GradeB	240	≥ 415	ASTM A516 Grade65
	A672 GradeC60	220	415 – 550	ASTM A516 Grade60
	A672 GradeC70	260	485 – 620	ASTM A516 Grade70
ASTM A860	WPHY 42	290	415 – 585	-
	WPHY 52	360	455 – 625	-
	WPHY 60	415	515 – 690	-
	WPHY 65	450	530 – 705	-
API 5L	GradeB – PSL2	245 – 450	415 – 655	DNVGL SAWL 245
	X52 – PSL2	360 – 530	460 – 760	DNVGL SAWL 360
	X60 – PSL2	415 – 565	520 – 760	DNVGL SAWL 415
	X65 – PSL2	450 – 600	535 – 760	DNVGL SAWL 450
DNVGL-ST-F101	SAWL 245	245 – 450	415 – 760	API 5L GradeB
	SAWL 360	360 – 525	460 – 760	API 5L X52
	SAWL 415	415 – 565	520 – 760	API 5L X60
	SAWL 450	450 – 570	535 – 760	API 5L X65

¹⁾ depending on thickness

CLAD MATERIALS

The clad materials for the roll-bonded clad plates are supplied by leading manufacturers as slabs or plates.

Clad materials: Stainless steels and heat-resistant steels

Standard	EN material number	Steel grade	Mean pitting resistance	Comparable	
			equivalent number (PREN) Cr+3.3Mo+16N [%]	ASTM A240 / ASME SA240 type	
EN 10088	1.4000	X6Cr13	-	410S	
	1.4301	X5CrNi18-10	-	304	
	1.4306	X2CrNi19-11	-	304L	
	1.4541	X6CrNiTi18-10	-	321	
	1.4550	X6CrNiNb18-10	-	347	
	1.4401	X5CrNiMo17-12-2	25	316	
	1.4404	X2CrNiMo17-12-2	25	316L	
	1.4571	X6CrNiMoTi17-12-2	25	316Ti	
	1.4432	X2CrNiMo17-12-3	27	316L Mod Mo ≥ 2.5	
	1.4435	X2CrNiMo18-14-3	28	316L Mod Mo ≥ 2.5	
	1.4429	X2CrNiMoN17-13-3	29	316LN Mod Mo ≥ 2.5	
	1.4438	X2CrNiMo18-15-4	31	317L	
	1.4439	X2CrNiMoN17-13-5	35	317LMN	
	SEW 470	1.4828	X15CrNiSi20-12	-	-

Clad materials: Stainless steels and heat-resistant steels

Standard	UNS number	Steel grade	Mean pitting resistance equivalent number (PREN) Cr+3.3Mo+16N [%]	Comparable grade of EN 10088
ASTM A240 and ASME SA240	S41008	410S	-	1.4000
	S30400	304	-	1.4301
	S30403	304L	-	1.4306
	S32100	321	-	1.4541
	S34700	347	-	1.4550
	S31600	316	25	1.4401
	S31603	316L	25	1.4404
	-	316L Mod Mo \geq 2.5	27	1.4432/1.4435
	S31635	316Ti	25	1.4571
	S31653	316LN	27	-
	-	316LN Mod Mo \geq 2.5	29	1.4429
	S31703	317L	31	1.4438
	S31726	317LMN	35	1.4439

Clad materials: Special steels, non-ferrous metals and alloys

ASTM	Alloy type	Mean pitting resistance equivalent number (PREN) Cr+3.3Mo+16N [%]	Comparable grades		
			EN material number	EN / DIN / SEW	VdTÜV material sheet
B 409 UNS N08800	Alloy 800	-	1.4876	SEW 470	412
A 240/A 240M UNS N08904	Alloy 904 L	36	1.4539		421
B 709 UNS N08028	Alloy 28	39	1.4563	EN 10088	-
B 677 UNS N08926	Alloy 926	44	1.4529		502
B 463 UNS N08020	Alloy 20	28	2.4660	DIN 17744	-
B 424 UNS N08825	Alloy 825	31	2.4858	DIN 17744	432
B 443 UNS N06625	Alloy 625	51	2.4856	DIN 17744	499
B 575 UNS N06022	Alloy C 22	66	2.4602	DIN 17744	479
B 575 UNS N06455	Alloy C 4	67	2.4610	DIN 17744	424
B 575 UNS N10276	Alloy C 276	68	2.4819	DIN 17744	400
B 575 UNS N06059	Alloy 59	75	2.4605	DIN 17744	505
B 333 UNS N10665	Alloy B 2	-	2.4617	DIN 17744	436
B 168 UNS N06600	Alloy 600	-	2.4816	DIN 17742	305
B 127 UNS N04400	Alloy 400	-	2.4360	DIN 17743	263
B 162 UNS N02200	Alloy 200	-	2.4066		-
B 162 UNS N02201	Alloy 201	-	2.4068	DIN 17740	345
B 152 UNS C10300	Copper	-	2.0070	DIN 1787	-
B 152 UNS C12200	Copper	-	CW 024 A		-
B 171 UNS C70600	Alloy CuNi 90/10	-	CW 352 H	EN 1652	420
B 171 UNS C71500	Alloy CuNi 70/30	-	CW 354 H		-

OUR PATH TO A GREENER FUTURE

Premium products in the greentec steel Edition

With greentec steel, voestalpine is pursuing an ambitious step-by-step plan in the long-term decarbonization of steel production. The declared objective is to achieve carbon-neutral production by 2050, and the initial steps have already been taken. Process-optimized production operations already prevent up to 10% of the direct CO₂ emissions at the Linz site. The material and processing properties of the steel are not affected in any way in this production route. Each voestalpine heavy plate product is available in premium quality in the greentec steel Edition with a reduced carbon footprint and unique benefits.

CO₂ footprint of clad plates

The CO₂ footprint of clad plates is highly dependent on the type of cladding material and the ratio between the clad layer and the base material. Therefore, each project is calculated individually to ensure the respective value.

The following table provides an illustrative overview for a cladding ratio of 22+3 mm:



Product	Carbon footprint or global warming potential [kg CO ₂ e per kg of steel]*		
	Standard value according EPD	greentec steel Edition clad	greentec steel Edition clad max
Carbon steel + austenitic stainless steel e.g. 316L (1.4404)	3.26	2.93	1.43
Carbon steel + ferritic stainless steel 410S (1.4000)	2.98	2.68	1.15
Carbon steel + Alloy 825 (2.4858)	4.57	4.11	2.74
Carbon steel + Alloy 625 (2.4856)	5.20	4.68	3.37
Carbon steel + copper (2.0070)	3.61	3.25	1.78

* per EN 15804+A2 (EPD methodology) cradle to gate, upon customer request also possible per worldsteel CML 2001-2016 (system expansion).

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