Outokumpu Products Wallchart

outokumpu
high performance stainless steel

Moda

Steels with PRE up to 17, for mildly corrosive environments.

Outokumpu Classic family

Steel designations				Performance				Typical chemical composition, % by mass					
		ASTM			A [1]	$R_{p0.2}$	Grade						
Outokumpu name	EN	Type	UNS	PRE	%	MPa	family	C	Cr	Ni	Mo	N	Others
Moda 430/4016	1.4016	430	S43000	16	20	280	F	0.05	16.2	–	–	–	–
Alternatives													
Moda 4510	1.4510	–	–	16	23	240	F	0.02	16.2	–	–	–	Ti
Moda 439/4510	1.4510	439	S43035	17	23	240	F	0.02	17.1	–	–	–	Ti
Moda 430Ti/4520	1.4520	430Ti	–	16	24	200	F	0.02	16.2	–	–	–	Ti
Moda 4589	1.4589	–	S42035	15	16	420	F	0.05	14	1.7	0.3	–	Ti
Low-Cr alternatives													
Moda 410L/4003	1.4003	410L	S40977	12	20	320	F	0.02	11.5	0.5	–	–	–
Moda 409/4512	1.4512	409	S40910 [2]	12	25	220	F	0.02	11.5	0.2	–	–	Ti
Moda 410S/4000	1.4000	410S	S41008	13	19	250	F	0.03	12.5	–	–	–	–

Grade family: F = ferritic. [1] Elongation reference varies between different standards, information referenced here denotes A_{80} – otherwise see footnote for specific grade or inquire to reference alternative standard. [2] UNS S40920 is also possible.

Core

Steels with PRE 17–22, for corrosive environments.

Outokumpu Classic family

Steel designations				Performance				Typical chemical composition, % by mass					
		ASTM			A [1]	$R_{p0.2}$	Grade						
Outokumpu name	EN	Type	UNS	PRE	%	MPa	family	C	Cr	Ni	Mo	N	Others
Core 304/4301	1.4301	304	S30400	18	45	230	A	0.04	18.1	8.1	–	–	–
Core 304L/4307	1.4307	304L	S30403	18	45	220	A	0.02	18.1	8.1	–	–	–
Alternatives													
Core 304LN/4311	1.4311	304LN	S30453	21	40	290	A	0.02	18.5	9.2	–	0.14	–
Core 304L/4306	1.4306	304L	S30403	18	45	220	A	0.02	18.2	10.1	–	–	–
Core 305/4303	1.4303	305	S30500	18	45	220	A	0.04	17.7	12.5	–	–	–
Core 321/4541	1.4541	321	S32100	17	40	220	A	0.04	17.3	9.1	–	–	Ti
Core 347/4550	1.4550	347	S34700	18	40	220	A	0.05	17.5	9.5	–	–	Nb
Core 301LN/4318	1.4318	301LN	S30153	20	35	350	A	0.02	17.7	6.5	–	0.14	–
Core 301/4310	1.4310	301	S30100	17	40	250	A	0.1	17	7	–	–	–
Low-Ni alternatives													
Core 201/4372	1.4372	201	S20100	17	45	350	A	0.05	16.1	3.6	–	0.08	Cu 6.6Mn
Core 201LN/4372	1.4372	201LN	S20153	19	45	350	A	0.02	16.2	4.1	–	0.16	Cu 6.6Mn
Ni-free alternatives													
Core 441/4509	1.4509	–	S43940	18	18	250	F	0.02	17.6	–	–	–	Ti Nb
Core 439M	–	–	S43932	18	22 [1]	205 [1]	F	0.02	17.6	–	–	–	Ti Nb
Core 4622	1.4622	–	S44330	21	22 [2]	300 [2]	F	0.02	21	–	–	–	Ti Nb Cu

Grade family: A = austenitic, F = ferritic. [1] Min. values acc. to ASTM A240, for strip t ≤ 5 mm. Elongation reference varies between different standards, information referenced here denotes A_{80} – otherwise see footnote for specific grade or inquire to reference alternative standard. [2] Min. values acc. to EN 10028-7.

Supra

Steels with PRE 22–26, for highly corrosive environments.

Outokumpu Classic family

Steel designations				Performance				Typical chemical composition, % by mass					
		ASTM			A [1]	$R_{p0.2}$	Grade						
Outokumpu name	EN	Type	UNS	PRE	%	MPa	family	C	Cr	Ni	Mo	N	Others
Supra 316/4401	1.4401	316	S31600	24	40	240	A	0.04	17.2	10.1	2.1	–	–
Supra 316L/4404	1.4404	316L	S31603	24	40	240	A	0.02	17.2	10.1	2.1	–	–
Alternatives													
Supra 316plus	1.4420	–	S31655	26	35 [2]	350 [2]	A	0.02	20.3	8.6	0.7	0.19	–
Supra 316/4436	1.4436	316	S31600	25	40	240	A	0.04	16.9	10.7	2.6	–	–
Supra 316L/4432	1.4432	316L	S31603	25	40	240	A	0.02	16.9	10.7	2.6	–	–
Supra 316L/4435	1.4435	316L	S31603	26	40	240	A	0.02	17.3	12.6	2.6	–	–
Supra 316Ti/4571	1.4571	316Ti	S31635	24	40	240	A	0.04	16.8	10.9	2.1	–	Ti
Ni-free alternatives													
Supra 444/4521	1.4521	444	S44400	25	20	320	F	0.02	18	–	2	–	Nb Ti

Grade family: A = austenitic, F = ferritic. [1] Elongation reference varies between different standards, information referenced here denotes A_{80} – otherwise see footnote for specific grade or inquire to reference alternative standard. [2] Min. values acc. to EN 10028-7.

PRE = %Cr + 3.3 x %Mo + 16 x %N. Values for $R_{p0.2}$ yield strength and the A_{80} for elongation are according to EN 10088-2 min. values for cold rolled strip. Chemical compositions and PRE calculations are based on Outokumpu typical values.

Forta

Duplex and other high strength steels (proof strength $R_{p0.2}$ > 400 MPa), PRE 16 to 43.

Outokumpu Pro family

Steel designations				Performance				Typical chemical composition, % by mass					
		ASTM			A [1]	$R_{p0.2}$	Grade						
Outokumpu name	EN	Type	UNS	PRE	%	MPa	family	C	Cr	Ni	Mo	N	Others
Duplex, high strength, high corrosion resistance and enhanced resistance to stress corrosion cracking													
Forta DX 2205	1.4462	–	S32205 [2]	35	20	500	D	0.02	22.4	5.7	3.1	0.17	–
Forta LDX 2101	1.4162	–	S32101	26	20	530	D	0.03	21.5	1.5	0.3	0.22	5Mn Cu
Forta DX 2304	1.4362	–	S32304	26	20	450	D	0.02	23	4.8	0.3	0.1	Cu
Forta EDX 2304	1.4362	–	S32304	28	25 [3]	500 [3]	D	0.02	23.8	4.3	0.5	0.18	Cu
Forta LDX 2404	1.4662	–	S82441	34	20	550	D	0.02	24	3.6	1.6	0.27	3Mn Cu
Forta SDX 100	1.4501	–	S32760	42	25 [4]	530 [4]	D	0.02	25.4	6.9	3.8	0.27	W Cu
Forta SDX 2507	1.4410	–	S32750	43	20	550	D	0.02	25	7	4	0.27	–
High strength and high ductility													
Forta H400	1.4376	–	–	–	40	400	A	0.04	17.5	4	–	0.2	6.8Mn
Forta H500	–	–	–	–	40 [5]	500 [5]	A	0.32	14	–	–	0.32	16Mn
High strength and high hardness (temper rolled) [6]													
Forta H800	–	–	–	–	30 [7]	800 [7]	A	0.32	14	–	–	0.32	16Mn
Forta H1000	–	–	–	–	13 [7]	1000 [7]	A	0.32	14	–	–	0.32	16Mn
Forta 430/4016	1.4016	430	S43000	16	–	350 – 700	F	0.05	16.2	–	–	–	–
Forta 301LN/4318	1.4318	301LN	S30153	20	–	500 – 900	A	0.02	17.7	6.5	–	0.14	–
Forta 301/4310	1.4310	301	S30100	17	–	500 – 1300	A	0.1	17	7	–	–	–
Forta 304/4301	1.4301	304	S30400	18	–	350 – 1300	A	0.04	18.1	8.1	–	–	–
Forta 304L/4307	1.4307	304L	S30403	18	–	350 – 1300	A	0.02	18.1	8.1	–	–	–
Forta 316/4401	1.4401	316	S31600	24	–	350 – 700	A	0.04	17.2	10.1	2.1	–	–
Forta 316L/4404	1.4404	316L	S31603	24	–	350 – 700	A	0.02	17.2	10.1	2.1	–	–
Forta 316plus	1.4420	–	S31655	25	–	500 – 700 [7]	A	0.02	20.3	8.6	0.7	0.19	–
Forta 316Ti/4571	1.4571	316Ti	S32100	24	–	350 – 700	A	0.04	16.8	10.9	2.1	–	Ti

Grade family: D = duplex, A = austenitic, F = ferritic. [1] Min. values acc. to ASTM A240, for strip t ≤ 5 mm. Elongation reference varies between different standards, information referenced here denotes A_{80} – otherwise see footnote for specific grade or inquire to reference alternative standard. [2] Also available in S31803. [3] Outokumpu MDS-D35 for EDX 2304. [4] Min. values for plate acc. to EN 10088-2. [5] Values acc. to Stahl-Eisen-Liste. [6] Products with higher strength available on request. [7] Outokumpu tested values.

Ultra

Steels with PRE > 27, for extremely corrosive environments.

Outokumpu Pro family

Steel designations				Performance				Typical chemical composition, % by mass					
		ASTM			A [1]	$R_{p0.2}$	Grade						
Outokumpu name	EN	Type	UNS	PRE	%	MPa	family	C	Cr	Ni	Mo	N	Others
Ultra 904L	1.4539	904L	N08904	34	35	240	A	0.01	19.8	24.2	4.3	–	1.4Cu
Ultra 254 SMO	1.4547	–	S31254	43	35	320	A	0.01	20	18	6.1	0.2	Cu
Alternatives													
Ultra 317L [2]	(1.4438) [3]	317L	S31703	28	40 [4]	205 [4]	A	0.02	18.2	11.6	3.1	–	–
Ultra 725LN	1.4466	–	S31050	34	40 [5]	250 [5]	A	0.01	25	22.3	2.1	0.12	–
Ultra 6XN	1.4529	–	N08926/ N08367	45	40 [5]	300 [5]	A	0.01	20.5	24.8	6.5	0.2	Cu
Ultra 654 SMO	1.4652	–	S32654	56	40	430	A	0.01	24	22	7.3	0.5	3.5Mn Cu
Ultra Alloy 825	2.4858 [6]		N08825	34	30 [7]	241 [7]	A	0.01	23	39	3.2	–	Cu, Ti

Grade family: A = austenitic. [1] Elongation reference varies between different standards, for coil the standard typically uses A80 – otherwise see footnote for specific grade.
[2] Also available with 11.7% Ni which is not consistent with 1.4438. [3] Quarto plate also available as EN 1.4438. Coil only available as ASTM 317L. [4] Min values acc. to ASTM A-240
[5] Min. values for plate acc. to EN 10088-2. [6] Grade designation according to DIN 17750. [7] Min. values hot-rolled and cold-rolled acc. to ASTM B424.

PRE = %Cr + 3.3 x %Mo + 16 x %N. Values for $R_{p0.2}$ yield strength and the A_{80} for elongation are according to EN 10088-2 min. values for cold rolled strip. Chemical compositions and PRE calculations are based on Outokumpu typical values.

Dura

Heat treatable steels for greater hardness and strength.

Outokumpu Pro family

Steel designations				Performance			Typical chemical composition, % by mass					
		ASTM			R_m [2]	Grade						
Outokumpu name	EN	Type	UNS	HRC [1]	MPa	family	C	Cr	Ni	Mo	N	Others
Dura 410/4006	1.4006	410	S41000	–	540	M	0.12	12	–	–	–	–
Dura 4024	1.4024	–	–	–	550	M	0.16	13.2	–	–	–	–
Dura 420/4021	1.4021	420	S42000	44 – 50 [3]	580	M	0.2	13	–	–	–	–
Dura 420/4028	1.4028	420	S42000	45 – 51 [3]	620	M	0.3	12.5	–	–	–	–
Dura 420/4031	1.4031	420	S42000	47 – 53 [3]	640	M	0.38	13.5	–	–	–	–
Dura 420/4034	1.4034	420	S42000	49 – 55 [3]	700	M	0.45	13.7	–	–	–	–
Dura 4419	1.4419	–	–	46 – 52 [3]	660	M	0.38	13.3	–	0.9	–	–
Dura 4110	1.4110	–	–	50 – 56 [3]	680	M	0.5	14.8	–	0.6	–	–
Dura 4116	1.4116	–	–	–	680	M	0.5	14.4	–	0.6	–	V
Dura 4122	1.4122	–	–	47 – 53 [3]	650	M	0.41	16.1	–	1	–	–
Precipitation hardening												
Dura 17-7PH	1.4568	631	S17700	38 – 41 [4]	820	PH	0.08	17	7	–	–	Al
Dura 17-4PH	1.4542	630	S17400	24 – 40 [4]	1100	PH	0.02	15.5	4.8	–	–	3.4Cu Nb

Grade family: M = martensitic, PH = precipitation hardening. [1] Achievable Rockwell hardness after final heat treatment of the fabricated part. [2] Tensile strength in mill condition, Outokumpu typical values. [3] Hardness range according to EN 10088-2. [4] Hardness range according to ASTM A564 (minimum values for different heat treatment conditions).

Therma

Steels for high temperature applications (>550 °C).

Outokumpu Pro family

Steel designations				Performance		Typical chemical composition, % by mass					
		ASTM		Max. service	Grade						
Outokumpu name	EN	Type	UNS	temp. (°C) [1]	family	C	Cr	Ni	Mo	N	Others
Therma 253 MA	1.4835	–	S30815	1150	A	0.09	21	11	–	0.17	Si Ce
Therma 310S/4845	1.4845	310S	S31008	1050	A	0.05	25.5	19.1	–	–	–
Resistance to sulfur containing hot gases, lower thermal expansion											
Therma 4713	1.4713	–	–	800	F	0.06	6.5	–	–	–	Al Si
Therma 4724	1.4724	–	–	850	F	0.07	12.5	–	–	–	Al Si
Resistance to carburizing and nitriding/low oxygen hot gas, higher creep strength											
Therma 304H/4948	1.4948	304H	S30409	750	A	0.05	18.1	8.3	–	–	–
Therma 321H/4878	1.4878	321H	–	850	A	0.05	17.3	9.1	–	–	Ti
Therma 347H	–	347H	S34709	700	A	0.05	17.5	9.5	–	–	Nb
Therma 4828	1.4828	–	–	1000	A	0.05	19.3	11.2	–	–	Si
Therma 309S/4833	1.4833	309S	S30908	1000	A	0.06	22.3	12.3	–	–	–
Therma 314/4841	1.4841	314	S31400	1150	A	0.06	24.3	19.2	–	–	Si

Grade family: A = austenitic, F = ferritic. [1] In dry air acc. EN 10095.

Prodec

Stainless steel grades optimized for improved machinability with longer tool life and enhanced quality.

Outokumpu Pro family

Steel designations				Performance						Typical chemical composition, % by mass					
					HRB [1]		CDB [2]								
		ASTM			A [3]	$R_{p0.2}$	A [3]	$R_{p0.2}$	Grade						
Outokumpu name	EN	Type	UNS	PRE	%	MPa	%	MPa	family	C	Cr	Ni	Mo	N	Others
Plate															
Prodec 304L/4307 [4]	1.4307	304L	S30403	18	45 [7]	200 [7]	–	–	A	0.02	18.2	8.1	–	–	–
Prodec 316L/4404 [5]	1.4404	316L	S31603	25	45 [7]	220	–	–	A	0.02	17.2	11.1	2.3	–	–
Prodec 316L/4432 [6]	1.4432	316L	S31603	25	45 [7]	220	–	–	A	0.02	16.8	10.7	2.6	–	–
Bar															
Prodec 304L/4307	1.4307	304L	S30403	18	45	175	25/25/30	400/380/175	A	0.02	18.1	8.1	–	–	0.03S
Prodec 316L/4404	1.4404	316L	S31603	24	40	200	25/25/30	400/380/200	A	0.02	17.2	10.1	2.1	–	0.03S
Prodec 303/4305	1.4305	303	S30300	17	35	190	15/15/20	400/400/190	A	0.05	17.2	8.1	–	–	0.3S
Prodec 17-4PH [8]	1.4542	630	S17400	–	10	520	10/10/12	600/600/520	PH	0.02	15.5	4.8	–	–	3.4Cu Nb 0.03S

Grade family: A = austenitic, PH = precipitation hardening. [1] HRB = Hot rolled bar. [2] CDB = Cold drawn bar. Values are for diameter (d) ≤ 10 mm & 10 < d ≤ 16 mm & 16 < d ≤ 40 mm. [3] Elongation reference varies between different standards, for coil the standard typically uses A_{80} – otherwise see footnote for specific grade. [4] Also available as ASTM 304/EN 4301. [5] Also available as ASTM 316/EN 4346. [6] Also available as ASTM 316/EN 4401. [7] min values plate acc. To 10088-2. [8] Values for condition +P800.

PRE = %Cr + 3.3 x %Mo + 16 x %N. Values for $R_{p0.2}$ yield strength and the A_{80} for elongation are according to EN 10088-2 min. values for cold rolled strip. Chemical compositions and PRE calculations are based on Outokumpu typical values.

Deco

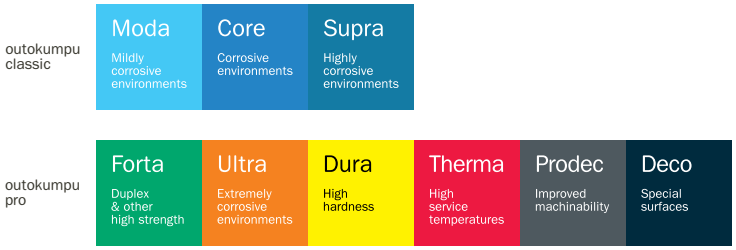
Special surfaces.

Outokumpu Pro family

	EN	ASTM Finish	Description	Available steel grades [1]	Available versions	Available dimensions [2]
Polished/brushed						
Deco 4N	2K	4	Most-sold polish at Outokumpu with elegant, satin-like look.	most of Moda, Core and Supra	–	0.5–5.5 mm thick up to 1524 mm wide
Deco Microlon	2K	4	Elegant, dark grey surface finish that gives interior and exterior claddings a classy look.			
Brushed No.5	2J	6	Slightly glossy and elegant finish in between a fine polished and a fine brushed look.			
Patterned						
Deco Square	2M	–	Clearly structured pattern creating a technical impression. Raised and recessed sections have different reflection characteristics.	Moda 430/4016 Core 441/4509 Core 304/4301 Core 304L/4307 Supra 316/4401 Supra 316L/4404 Forta DX 2205	(standard) Star Matt Supermatt	0.3–3.5 mm thick up to 1500 mm wide
Deco Croc Skin	2M	–	Combines the advantages of a stainless steel surface with an organic-like texture.			
Deco Diamonds	2M	–	Strictly geometric pattern given added tension by its diagonal orientation.			
Deco Linen	2M	–	Pattern of closely alternating dots and dashes resembling a textile surface, remains intact even under forming.			
Deco Linen without Slubs	2M	–	Removing the distinctive linen thread makes Deco Linen less directional and increases its even and elegant look.			
Deco Vertical Linen	2M	–	The slubs of regular Deco Linen are tilted by 90° to create a smoother pattern flow and enhanced verticality.			
Deco Nine	2M	–	A coarser version of Deco Linen with more pronounced linen threads.			
Deco Microlinen	2M	–	A scaled-down version of the typical Deco Linen pattern causing a finer, denser and more delicate appearance.			
Deco Microlinen without Slubs	2M	–	The scaled-down version of Deco Linen is available without the linen thread to create a fine, dense and less directional finish.			
Deco Bark	2M	–	Creates an organic allurement by picking up the vertical groove-like structure of wood.			
Deco Rill	2M	–	The highly precise alternation between high and low running rills generates a strict linearity.			
Deco Haze	2M	–	Finish appears like sun shine through fog. Capable of withstanding heavy forming operations.			
Deco Bricks	2M	–	Scaled-down version of a brick wall, creating an industrial impression.			
Deco Austenite	2M	–	Modeled on the microstructure of an austenitic stainless steel, plays with the light to create a dazzling effect.			
Deco Laser	2M	–	Digitalized micro-patterns, randomly arranged without pattern repetition. A nearly homogenenous surface is observed under all viewing angles and light conditions.			
Deco Ice Crystals	2M	–	Irregular coarse structure. Insensitive to fingerprints, scratches and other surface damages.			
Deco Leather Grain	2M	–	Irregular structure similar to a leather surface. Insensitive to fingerprints, scratches and other surface damages.			
Deco Sand Surface	2M	–	Fine irregulare structure creating the impression of a sand surface.			
Special surfaces						
Deco 2R²	2R	BA	High-gloss surface closing the gap between standard bright annealed and mirror polished materials.	Core 304/4301, Core 304L/4307 Supra 316/4401, Supra 316L/4404	–	0.4–1.2 mm thick up to 1500 mm wide
Deco Supermatt	2E	–	Industrially shot blasted surface finish with a homogeneously matt high class appearance.	Core 304/4301, Core 304L/4307 Supra 316/4401, Supra 316L/4404	(standard) Deco Supermatt 1800d Deco Supermatt 2400d	0.5–4.5 mm thick up to 1500 mm wide
Deco Rolled-On	2F	3 / 4	A rolled-on finish with similar properties and appearance to a polished surface but with easy-to-clean properties and good corrosion resistance.	Moda 430/4016 Core 304/4301, Core 304L/4307	–	0.4–3.4 mm thick up to 1219 mm wide

[1] Other grades on request. [2] Full details on request.

Outokumpu product ranges

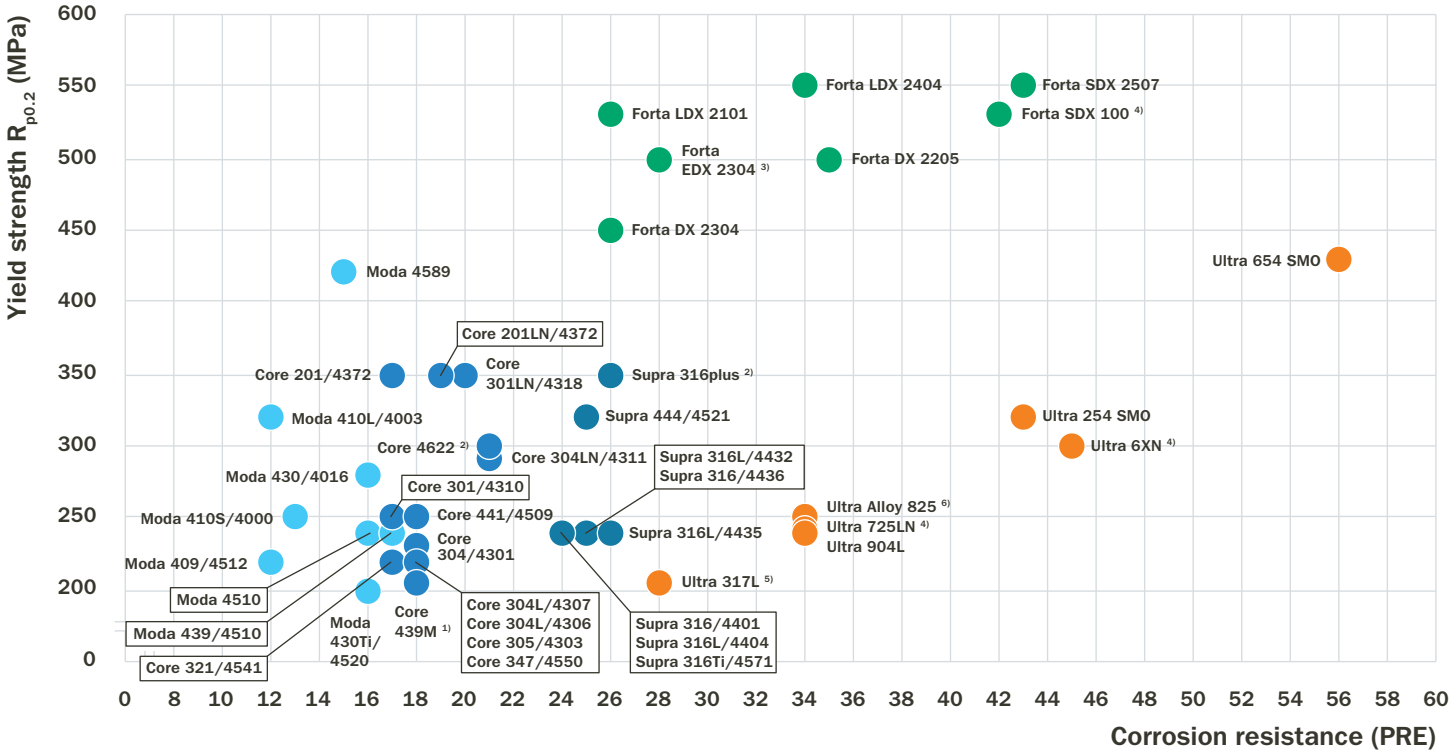


PRE = %Cr + 3.3 x %Mo + 16 x %N. Values for $R_{p0.2}$ yield strength and the A_{80} for elongation are according to EN 10088-2 min. values for cold rolled strip. Chemical compositions and PRE calculations are based on Outokumpu typical values.

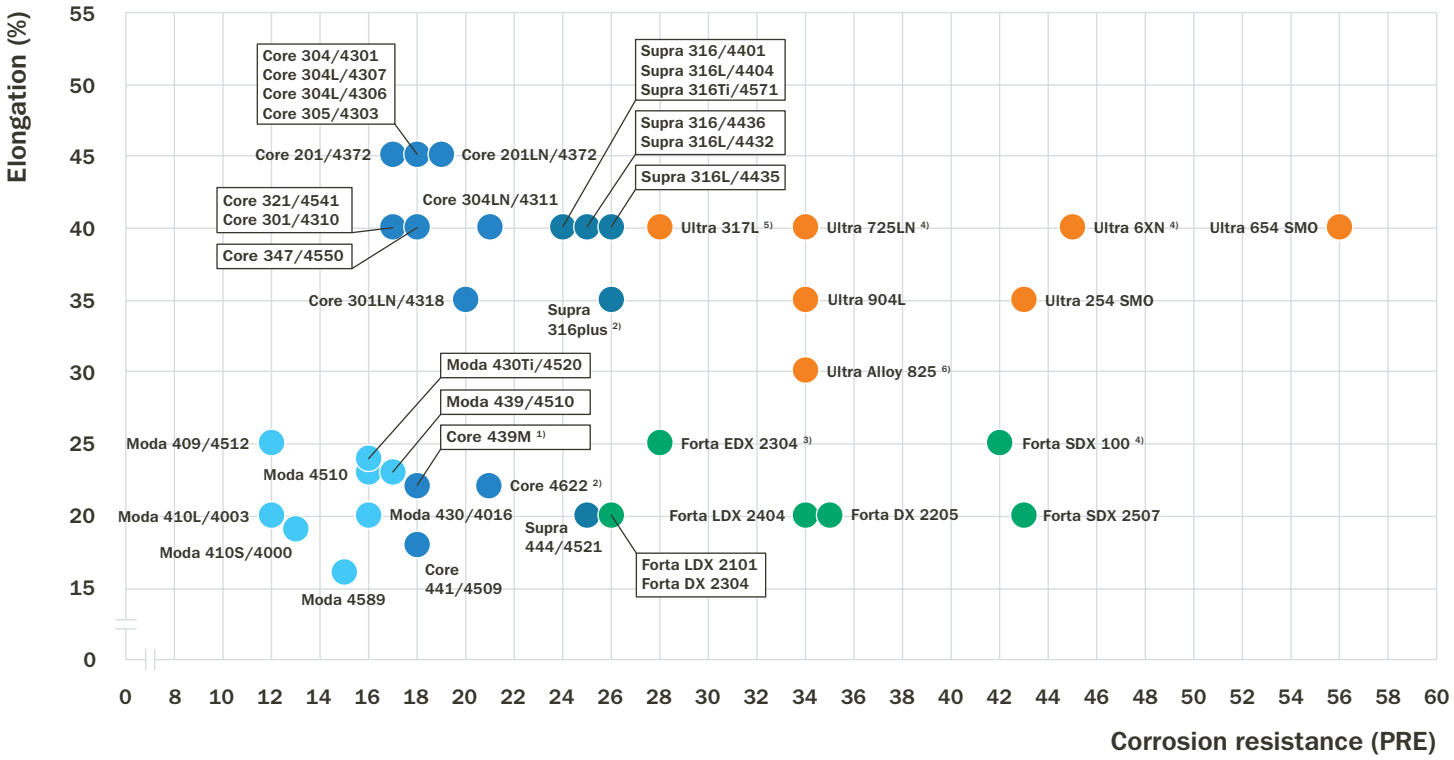
outokumpu
high performance stainless steel

Performance

Strength vs. corrosion resistance



Elongation vs. corrosion resistance



- Moda – Steels for mildly corrosive environments (PRE ≤17)
- Core – Steels for corrosive environments (PRE 17–22)
- Supra – Steels for highly corrosive environments (PRE 22–26)
- Forta – Duplex steels (PRE 26–43)
- Ultra – Steels for extremely corrosive environments (PRE > 27)

Values for $R_{p0.2}$ yield strength and the A_{80} for elongation are according to EN 10088-2 min. values for cold rolled strip. Chemical compositions and PRE calculations are based on Outokumpu typical values.

[1] Elongation reference varies between different standards, for coil the standard typically uses A_{80} – otherwise see footnote for specific grade.
[2] Min. values acc. to EN 10028-7.
[3] Outokumpu MDS-D35 for EDX 2304.
[4] Min. values for plate acc. to EN 10088-2.
[5] Min values acc. to ASTM A-240.
[6] Min. values hot-rolled and cold-rolled acc. to ASTM B424.

Please see values for other product forms at **steelfinder.outokumpu.com**

1000EN-US:16. February, 2021.