

Moda range

Mildly corrosive environments

Steel designations				Performance				Typical chemical composition, % by mass					
Outokumpu name	EN	ASTM		PRE	A ₈₀ %	R _{p0.2} MPa	Grade family	C	Cr	Ni	Mo	N	Others
		Type	UNS										
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 4511	1.4511	–	–	16	23	240	F	0.02	16.2	–	–	–	Nb
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	14.0	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	–	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	–	–	–	–

Core range

Corrosive environments

Steel designations				Performance				Typical chemical composition, % by mass					
Outokumpu name	EN	ASTM		PRE	A ₈₀ /A ₅₀ ¹ %	R _{p0.2} MPa	Grade family	C	Cr	Ni	Mo	N	Others
		Type	UNS										
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	0.10	17.0	7.0	–	–	–
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	–	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	21.0	–	–	–	Ti Nb Cu
Core 434/4113	1.4113	434	S43400	20	18	280	F	0.05	16.5	–	1.0	–	–

¹⁾ Min. values acc. to ASTM A240, for strip t ≤ 5 mm. ²⁾ Min. values acc. to EN 10028-7.

Supra range

Highly corrosive environments

Steel designations				Performance				Typical chemical composition, % by mass					
Outokumpu name	EN	ASTM		PRE	A ₈₀ %	R _{p0.2} MPa	Grade family	C	Cr	Ni	Mo	N	Others
		Type	UNS										
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 ¹⁾	350 ¹⁾	A	0.02	20.3	8.6	0.7	0.19	–
Supra 316L/SANS4402	SANS4402	–	–	24	50 ²⁾	290 ²⁾	A	0.02	17.2	10.1	2.1	–	–
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 alternative													
Supra 444/4521	1.4521	444	S44400	25	20	320	F	0.02	18.0	–	2.0	–	Nb Ti

¹⁾ Min. values acc. to EN 10028-7. ²⁾ Min. values acc. to SANS 50028-7.

PRE = %Cr + 3.3 x %Mo + 16 x %N

Values for R_{p0.2} yield strength and the A₈₀ 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.

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

Grade families:

A = Austenitic

F = Ferritic

D = Duplex

M = Martensitic

PH = Precipitation hardening

Outokumpu Pro family

Forta range

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

Steel designations				Performance				Typical chemical composition, % by mass					
Outokumpu name	EN	ASTM Type	UNS	PRE	A_{80}/A_{50}^4 %	$R_{p0.2}$ MPa	Grade 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	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	23.0	4.8	0.3	0.10	Cu
Forta EDX 2304	1.4362	–	S32304	28	25 ¹⁾	500 ¹⁾	D	0.02	23.8	4.3	0.5	0.18	Cu
Forta LDX 2404	1.4662	–	S82441	34	20	550	D	0.02	24.0	3.6	1.6	0.27	3Mn Cu
Forta SDX 100	1.4501	–	S32760	42	25 ²⁾	530 ²⁾	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	25.0	7.0	4.0	0.27	–
Forta FDx 27	1.4637 ³⁾	–	S82031	27	35 ⁴⁾	500 ⁴⁾	D	≤0.04	19.0–22.0	2.0–4.0	0.6–1.4	0.14–0.24	≤2.5Mn
High strength and high ductility													
Forta H400	1.4376	–	–	–	40	400	A	0.04	17.5	4.0	–	0.20	6.8Mn
Forta H500	–	–	–	–	40 ⁵⁾	500 ⁵⁾	A	–	–	–	–	–	–
Forta H800	–	–	–	–	30 ⁶⁾	800 ⁶⁾	A	–	–	–	–	–	–
Forta H1000	–	–	–	–	13 ⁶⁾	1000 ⁶⁾	A	–	–	–	–	–	–
High strength and high hardness (temper rolled) ⁷⁾													
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	0.10	17.0	7.0	–	–	–
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 ⁶⁾	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

¹⁾ Outokumpu MDS-D35 for EDX 2304. ²⁾ Min. values for plate acc. to EN 10088-2. ³⁾ Designation included in Stahl-Eisen-Liste. ⁴⁾ Min. values acc. to ASTM A240, for strip $t \leq 5$ mm. ⁵⁾ Values acc. to Stahl-Eisen-Liste. ⁶⁾ Outokumpu tested values. ⁷⁾ Products with higher strength available on request.

Ultra range

Extremely corrosive environments (PRE > 27)

Steel designations				Performance				Typical chemical composition, % by mass					
Outokumpu name	EN	ASTM Type	UNS	PRE	A_{80} %	$R_{p0.2}$ MPa	Grade 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	20.0	18.0	6.1	0.20	Cu
Alternatives													
Ultra 317L ¹⁾	1.4438	317L	S31703	28	40 ²⁾	220 ²⁾	A	0.02	18.2	13.7	3.1	–	–
Ultra 4439	1.4439	317LMN	S31726	33	35	290	A	0.02	17.3	13.7	4.1	0.14	–
Ultra 725LN	1.4466	–	S31050	34	40 ²⁾	250 ²⁾	A	0.01	25.0	22.3	2.1	0.12	–
Ultra 6XN	1.4529	–	N08926/ N08367	45	40 ²⁾	300 ²⁾	A	0.01	20.5	24.8	6.5	0.20	Cu
Ultra 4565	1.4565	–	S34565	46	30	420	A	0.02	24.0	17.0	4.5	0.45	5.5Mn
Ultra 654 SMO	1.4652	–	S32654	56	40	430	A	0.01	24.0	22.0	7.3	0.50	3.5Mn Cu

¹⁾ Also available with 11.7% Ni which is not consistent with 1.4438. ²⁾ Min. values for plate acc. to EN 10088-2.

Dura range

Heat treatable for greater hardness and strength

Steel designations				Performance			Typical chemical composition, % by mass						
Outokumpu name	EN	ASTM Type	UNS	HRC ¹⁾	R_m ²⁾ MPa	Grade family	C	Cr	Ni	Mo	N	Others	
Dura 410/4006	1.4006	410	S41000	–	540	M	0.12	12.0	–	–	–	–	
Dura 4024	1.4024	–	–	–	550	M	0.16	13.2	–	–	–	–	
Dura 420/4021	1.4021	420	S42000	44–50*	580	M	0.20	13.0	–	–	–	–	
Dura 420/4028	1.4028	420	S42000	45–51*	620	M	0.30	12.5	–	–	–	–	
Dura 420/4031	1.4031	420	S42000	47–53*	640	M	0.38	13.5	–	–	–	–	
Dura 420/4034	1.4034	420	S42000	49–55*	700	M	0.45	13.7	–	–	–	–	
Dura 4419	1.4419	–	–	46–52*	660	M	0.38	13.3	–	0.9	–	–	
Dura 4110	1.4110	–	–	50–56*	680	M	0.50	14.8	–	0.6	–	–	
Dura 4116	1.4116	–	–	–	680	M	0.50	14.4	–	0.6	–	V	
Dura 4122	1.4122	–	–	47–53*	650	M	0.41	16.1	–	1.0	–	–	
Precipitation hardening													
Dura 17-7PH	1.4568	631	S17700	38–41**	820	PH	0.08	17.0	7.0	–	–	–	Al
Dura 17-4PH	1.4542	630	S17400	24–40**	1100	PH	0.02	15.5	4.8	–	–	–	3.4Cu Nb
Dura 15-7PH	1.4574	632	S15700	40–45**	860	PH	0.08	14.5	7.5	2.2	–	–	Al

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. ^{**)} Hardness range according to ASTM A564 (minimum values for different heat treatment conditions).

Therma range

High service temperatures (> 550 °C)

Steel designations				Performance		Typical chemical composition, % by mass					
Outokumpu name	EN	ASTM		Max service temp. (°C) ¹⁾	Grade family	C	Cr	Ni	Mo	N	Others
		Type	UNS								
Therma 253 MA	1.4835	–	S30815	1150	A	0.09	21.0	11.0	–	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
Therma 4742	1.4742	–	–	1000	F	0.07	17.5	–	–	–	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 153 MA	1.4818	–	S30415	1050	A	0.05	18.5	9.1	–	0.15	Si Ce
Therma 314/4841	1.4841	314	S31400	1150	A	0.06	24.3	19.2	–	–	Si

¹⁾ In dry air acc. EN 10095.

Prodec range

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

Steel designations				Performance					Typical chemical composition, % by mass						
Outokumpu name	EN	ASTM		HRB ¹⁾			CDB ²⁾		Grade family	C	Cr	Ni	Mo	N	Others
		Type	UNS	PRE	A %	R _{p0.2} MPa	A %	R _{p0.2} MPa							
Prodec 304L/4307	1.4307	304L	S30403	18	45	175	25/25/30	400/380/175	A	0.02	18.1	8.1	–	–	–
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	–	–
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 ³⁾	1.4542	630	S17400	–	10	520	10/10/12	600/600/520	PH	0.02	15.5	4.8	–	–	3.4Cu Nb

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⁾ Values for condition +P800.

Deco range

Special surfaces

Available in	Description
Polished/brushed Wet Polished, Dry Polished, Brushed, Duplo (Polished and Brushed), Microlon	Polishing a stainless steel surface with an abrasive belt of a certain grain size leads to a homogeneous, satin-like and highly decorative surface finish. By optimizing the grain of the belt the surface finish can be fine-tuned to meet specific application requirements. Polished surfaces have more or less clearly visible scoring, which also makes scratches from daily wear and tear less visible. A polished surface is also easy to recreate, for example after repairs or welding work, compared with a 2B or 2R surface. Brushing (e.g. with Scotch Brite) provides a silky-matt finish with a pattern of very fine lines in brushing direction. The fine polishing grit lines of Microlon lead to an elegant, dark gray surface appearance that gives interior and exterior claddings a classy look.
Patterned Linen, Linen Matt, Linen Star, Linen Supermatt, Square, Diamonds, Microlinen, Leather Grain, Austenite, Haze, Laser, Microchecker, Waterfall, Triangle, Top Pearl, Ice Crystal, Beads, 1, 8, 9, 16, AN5	Pattern rolling of stainless steel leads to an enhanced combination of design and function. Outokumpu offers a large variety of patterned surface finishes each with different gloss and reflection effects. As standard we pattern roll on 2R and by special request on 2B. The most popular designs are Linen, Haze, Laser, Microlinen, Diamonds, Square, Microchecker and Leather Grain. Custom-made patterns can also be developed according to the customers needs. After pattern rolling a recovery annealing is performed for improved formability. Extremely high flatness is achieved by tension leveling.
Special surfaces 2R ² , GritLine, Rolled-On, Matt, Supermatt	High smoothness and reflectivity is achieved on the 2R ² finish almost equaling the gloss and smoothness of a mirror polished (No. 8) surface finish. GritLine and Rolled-On are surface finishes with similar properties to polished finishes but with improved corrosion resistance. The shot blasted surface finish called Supermatt is characterized by a dull, extremely homogeneous and high quality appearance.

For more information and images on the Deco special surfaces go to outokumpu.com/deco

$$PRE = \%Cr + 3.3 \times \%Mo + 16 \times \%N$$

Values for R_{p0.2} yield strength and the A₈₀ for elongation are according to EN 10088-2 min. values for cold rolled strip.

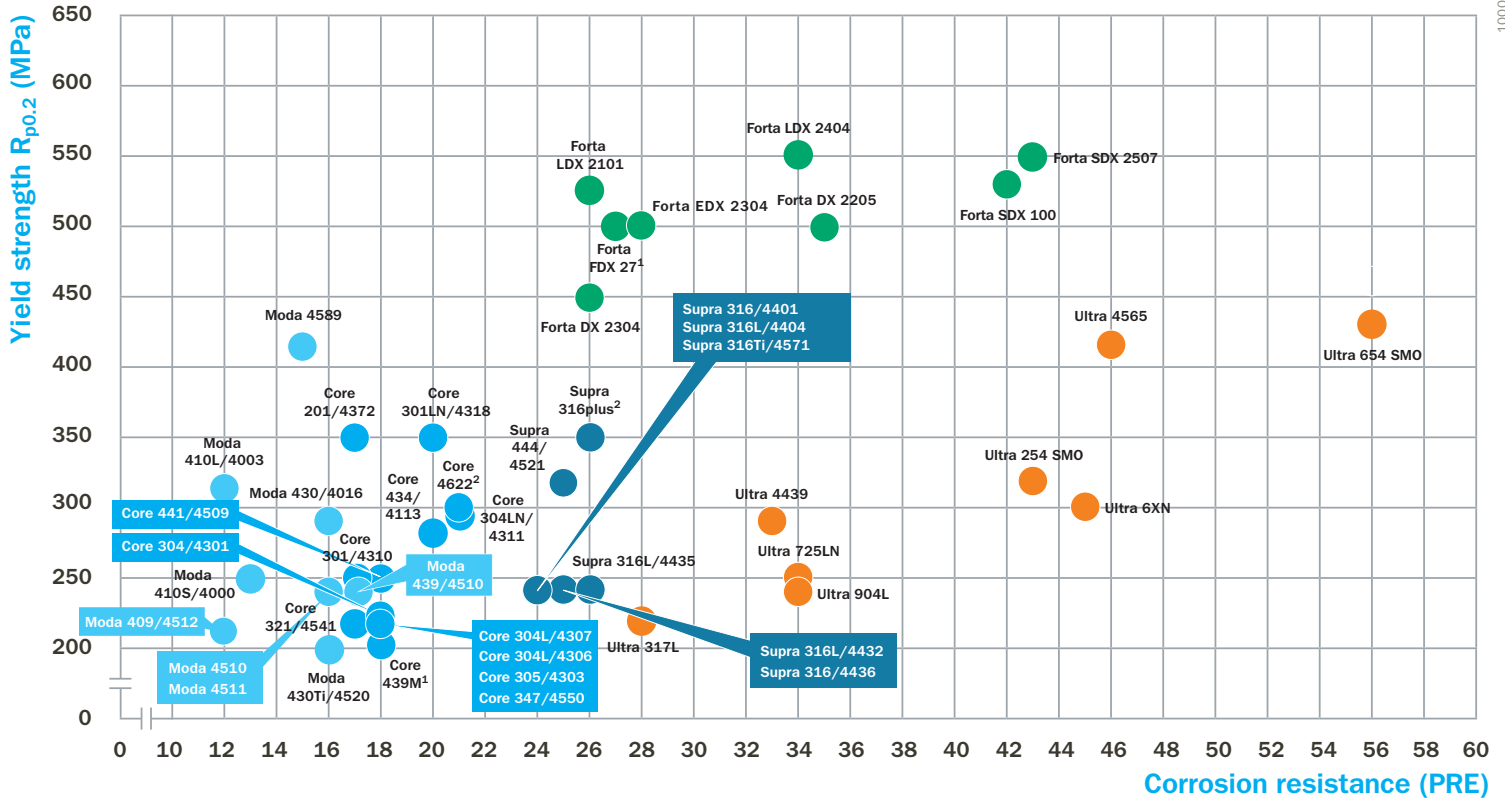
Chemical compositions and PRE calculations are based on Outokumpu typical values.

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

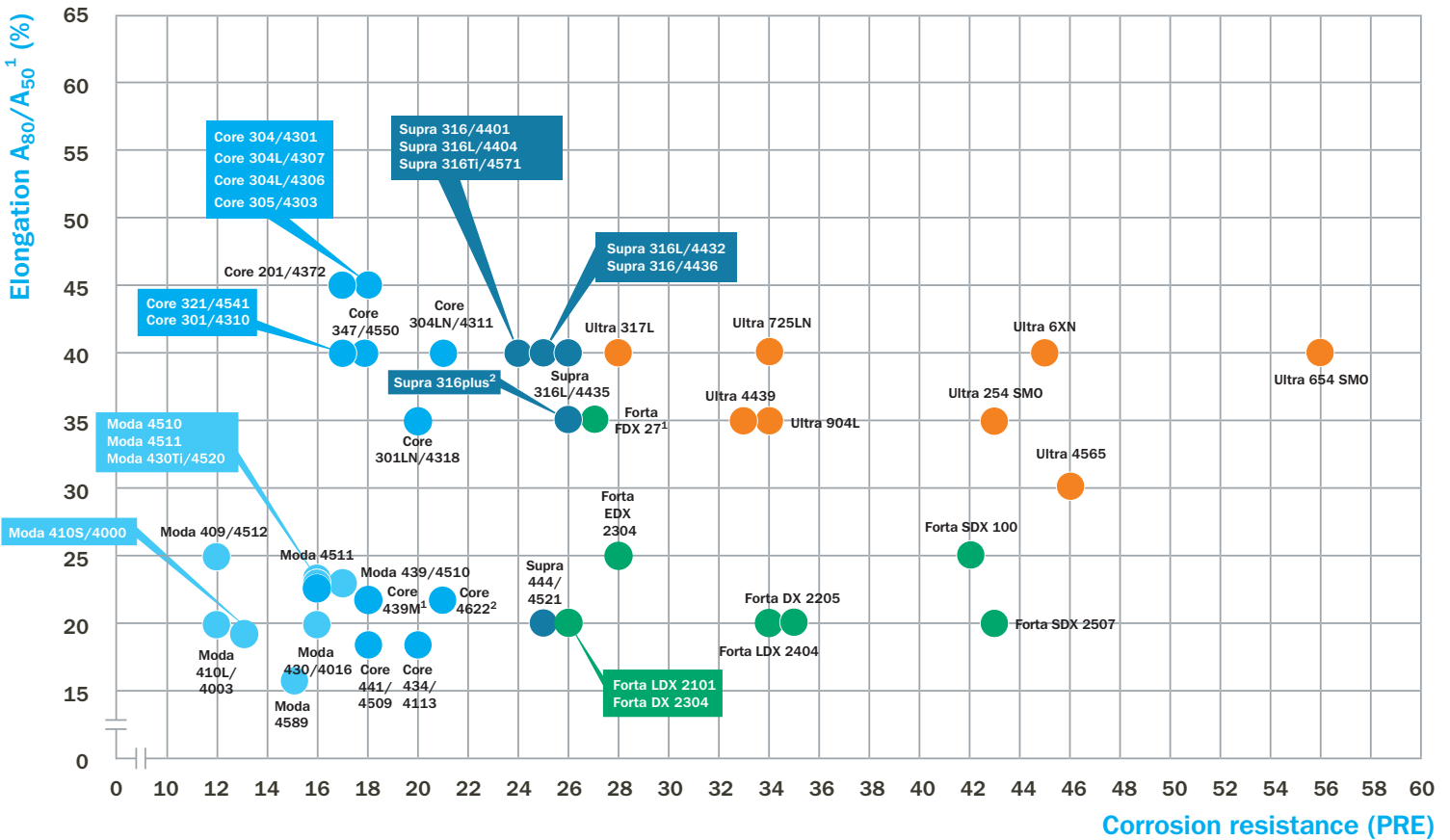
Grade families:

A = Austenitic
F = Ferritic
D = Duplex
M = Martensitic
PH = Precipitation hardening

Strength vs. corrosion resistance



Elongation vs. corrosion resistance



- Moda – Mildly corrosive environments
- Core – Corrosive environments
- Supra – Highly corrosive environments
- Forta – Duplex and other high strength (PRE 16 to 43)
- Ultra – 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) According to ASTM A240.
- 2) According to EN 10028-7.

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

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