

Welding Products

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MIG Wire

For gas metal arc welding manufactured to AWS A5.9.

Grades: 308LSI, 309LSI, 316LSI,
253MA/309HT, 2209LSI

Unit of Supply: Each



WWSM

Product Code	Product Size (mm)	Description	Weight ea (kg)
G308L			
WWSM100G308L15KG	1.0mm	MIG WIRE G308LSI - 19.9.LSI	15.00
G309L			
WWSM089G309LSI15KG	0.889mm	MIG WIRE G309LSI - 24.13.LSI	15.00
WWSM100G309LSI15KG	1.0mm	MIG WIRE G309LSI - 24.13.LSI	15.00
WWSM120G309LSI15KG	1.2mm	MIG WIRE G309LSI - 24.13.LSI	15.00
G316L			
WWSM080G316L15KG	0.8mm	MIG WIRE G316LSI - 19.12.3.LSI	15.00
WWSM089G316LSI15KG	0.889mm	MIG WIRE G316LSI - 19.12.3.LSI	15.00
WWSM100G316LSI15KG	1.0mm	MIG WIRE G316LSI - 19.12.3.LSI	15.00
WWSM120G316LSI15KG	1.2mm	MIG WIRE G316LSI - 19.12.3.LSI	15.00
WWSM160G316LSI15KG	1.6mm	MIG WIRE G316LSI - 19.12.3.LSI	15.00
G2209L			
WWSM100G2209L15KG	1.0mm	MIG WIRE G2209LSI - 22.8.3.LSI	15.00
WWSM120G2209L15KG	1.2mm	MIG WIRE G2209LSI - 22.8.3.LSI	15.00
G253MA / 309HT			
WWSM100G253MA15KG	1.0mm	MIG WIRE G253MA - 22.12.HT	15.00

Other grades and sizes available on request

TIG Wire

For gas tungsten arc welding AWS A5.9.

Grades: 308LSI, 309LSI, 316LSI, 2209L, 253MA, 2RK65/904L

Unit of Supply: Each



WWST

Product Code	Product Size (mm)	Description	Weight ea (kg)
G308L			
WWST120G308LSI+5KG	1.2mm	TIG WIRE G308LSI - 19.9.LSI	5.00
WWST160G308LSI+5KG	1.6mm	TIG WIRE G308LSI - 19.9.LSI	5.00
WWST200G308LSI+5KG	2.0mm	TIG WIRE G308LSI - 19.9.LSI	5.00
WWST240G308LSI+5KG	2.4mm	TIG WIRE G308LSI - 19.9.LSI	5.00
G309L			
WWST160G309LSI+5KG	1.6mm	TIG WIRE G309LSI - 24.13.LSI	5.00
WWST240G309LSI+5KG	2.4mm	TIG WIRE G309LSI - 24.13.LSI	5.00
G316L			
WWST100G316LSI+5KG	1.0mm	TIG WIRE G316LSI - 19.12.3.LSI	5.00
WWST120G316LSI+5KG	1.2mm	TIG WIRE G316LSI - 19.12.3.LSI	5.00
WWST160G316LSI+5KG	1.6mm	TIG WIRE G316LSI - 19.12.3.LSI	5.00
WWST200G316LSI+5KG	2.0mm	TIG WIRE G316LSI - 19.12.3.LSI	5.00
WWST240G316LSI+5KG	2.4mm	TIG WIRE G316LSI - 19.12.3.LSI	5.00
WWST320G316LSI+5KG	3.2mm	TIG WIRE G316LSI - 19.12.3.LSI	5.00
G2209L			
WWST160G2209L+5KG	1.6mm	TIG WIRE G2209L - 22.8.3.L	5.00
WWST200G2209L+5KG	2.0mm	TIG WIRE G2209L - 22.8.3.L	5.00
WWST240G2209L+5KG	2.4mm	TIG WIRE G2209L - 22.8.3.L	5.00
WWST320G2209L+5KG	3.2mm	TIG WIRE G2209L - 22.8.3.L	5.00
G253MA			
WWST120G253MA+5KG	1.2mm	TIG WIRE G253MA - 22.12.HT	5.00
WWST160G253MA+5KG	1.6mm	TIG WIRE G253MA - 22.12.HT	5.00
G2RK65			
WWST160G2RK65+5KG	1.6mm	TIG WIRE G2RK65 - 20.25.5.LCU	5.00
WWST240G2RK65+5KG	2.4mm	TIG WIRE G2RK65 - 20.25.5.LCU	5.00

Other grades and sizes available on request

MMA Flux Coated Electrodes

For manual metal arc welding to AWS A5.4

Grades: E308L, E309L, E309LMo, E316L, 253MA/309HT, SAF2205, 904L/2RK65

Unit of Supply: Each



WWSE

Product Code	Product Size (mm)	Description	Weight ea (kg)
G308L			
WWSE250G308L+3.5KG	2.5mm x 3.5KG PKT	ELECTRODES 308L - 19.9.LR	3.50
WWSE320G308L+4KG	3.2mm x 4KG PKT	ELECTRODES 308L - 19.9.LR	4.00
G309L			
WWSE250G309L+0.6KG	2.5mm x 0.6KG PKT	ELECTRODES 309L - 24.13.LR	
WWSE250G309L+3.5KG	2.5mm x 3.5KG PKT	ELECTRODES 309L - 24.13.LR	3.50
WWSE320G309L+4KG	3.2mm x 4.0KG PKT	ELECTRODES 309L - 24.13.LR	4.00
G309LMo			
WWSE250G309MOL+3.5KG	2.5mm x 3.5KG PKT	ELECTRODES 309MOL - 23.12.2.LR	3.50
G316L			
WWSE250G316L+3.5KG	2.5mm x 3.5KG PKT	ELECTRODES 316L - 19.12.3.LR	3.50
WWSE320G316L+1.7KG	3.2mm x 1.7KG PKT	ELECTRODES 316L - 19.12.3.LR	1.70
G253MA/309HT			
WWSE320G253MA+1.7KG	3.2mm x 1.7KG PKT	ELECTRODES 253MA/309HT - 22.12.HTR	1.70
G2205			
WWSE250G2205+1.7KG	2.5mm x 1.7KG PKT	ELECTRODES SAF2205 - 22.9.3.LR	1.70
WWSE320G2205+4.0KG	3.2mm x 4.0KG PKT	ELECTRODES SAF2205 - 22.9.3.LR	4.00

Other grades and sizes available on request

Submerged Arc Welding Wire

AWS A5.9.



Grades: 316L, 2209L

Unit of Supply: Each

WWSS

Product Code	Product Size (mm)	Description	Weight ea (kg)
G316L			
WWSS200G316L28KG	2.0mm - 28.0KG	SUB ARC WIRE G316L - 19.12.3.L	28.00
WWSS240G316L28KG	2.4mm - 28.0KG	SUB ARC WIRE G316L - 19.12.3.L	28.00
G2209L			
WWSS200G220925KG	2.0mm - 25.0KG	SUB ARC WIRE G2209 - 22.8.3.L	25.00
WWSS320G220925KG	3.2mm - 25.0KG	SUB ARC WIRE G2209 - 22.8.3.L	25.00

Other grades and sizes available on request

Neutralization Paste



WWSP

Product Code	Product Size	Description	Weight ea (kg)
WWSPNP+2.5KG	2.5KG	NEUTRALISATION PASTE + BRUSH	2.50

Neutralization paste is used on steel surfaces to neutralize and inhibit pickling paste after use. The neutralization paste does not contain any harmful components. It is as easy to apply as the pickling paste and can be flushed with water into any drain.

Working data

The neutralization paste is mixed in with the pickling paste, using a brush. This is done once pickling has been completed, while the pickling paste is still in place on the structure. A reaction occurs and mild blistering occurs. When blistering ceases (after about 5–10 min), the reaction has ceased and neutralization is complete.

After treatment, the pickling acid residue has a pH value of >8 and the poisonous hydrofluoric acid is chemically converted into harmless fluorspar (CaF_2). The neutralization paste is mildly alkaline and does not have any poisonous constituents.

Pickling Paste Formula 1



WWSF

Product Code	Product Size	Description	Weight ea (kg)
WWSPT1KG	1KG TUB	PICKLING PASTE 1KG TUB CLASS 6 POISON	1.00
WWSB39030G	BRUSH	PICKLING PASTE BRUSH	

Pickling paste Formula 1 is an effective pickling paste used for cleaning and passivating of welding joints and the heat affected zone (HAZ) for welded stainless steel constructions.

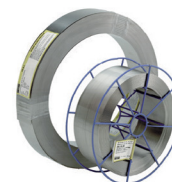
The pickling paste removes the naturally occurring oxide layer and the chromium depleted layer under the oxide. The result is a perfect weld with the required corrosion resistance.

Excellent adhesion and economical to use

Pickling paste Formula 1 is rapid and economical to use, as only a thin film of the pickling paste is required for perfect result. The pickling paste has excellent adhesion and can be applied on vertical surfaces and ceilings without any risk of running or drying. This is due to the gel-like (thixotropic), homogenous consistency. The paste's consistency also makes it easy to apply without splashes, particularly important because of its aggressiveness.

Note: Brushes are sold separately to the paste.

Welding Consumables Selection Chart



Introduction

Welding consumables are specially formulated to ensure corrosion performance and are produced to conform to very tight specifications. The correct choice of consumable for a specific application is extremely important, and nowhere is it more important, for example, than in the construction of pressure vessels.

Vulcan Stainless can supply a welding consumable to meet your needs, one that is precisely adapted to the parent metal and that also has optimal welding characteristics. The following chart is provided as a guide to the correct selection of consumables. For any application out of the ordinary, we can provide the technical expertise to ensure the best result.

	Carbon Steel	Chrome Moly	ASTM 301/302 304/304L	ASTM 316/316L 316Ti	ASTM 321 347	ASTM 310 310S	253MA (309 HT)*	2RK65
Carbon Steel	E4113							
Chrome Moly	E4818	E8018						
ASTM 301/302	309L	309L	308LSi					
ASTM 304/304L	309LSi	309LSi	308LSi					
ASTM 316/316L	309LSi	309LSi	316LSi	316LSi				
ASTM 316Ti	SAF 2205	SAF 2205	309LSi	318				
ASTM 321/347	309LSi	309LSi	308 Lsi	316LSi	347			
	312	312	309LSi	307Mn	347			
ASTM 310/310S	307Mn	307Mn	307Mn	316LSi	347	310		
	310	312	310	310	310LSi			
253 MA (309 HT)*	309LSi	309LSi	253MA	253MA	253MA	253MA	253MA	
	309LSi	309LSi	347	309LSi	347	310	309LSi	
2RK65	2RK65	2RK65	2RK65	2RK65	2RK65	2RK65	2RK65	2RK65
	San 28	San 28	316LSi	2RK65	2RK65	San 72	San 72	San 72
LDX 2101	23.7.L	23.7.L	23.7.L	23.7.L	23.7.L	23.7.L	23.7.L	23.7.L
SAF 2304	SAF 2205	SAF 2205	SAF 2205	SAF 2205	SAF 2205	SAF 2205	SAF 2205	SAF 2205
SAF 2205	309LSi	309LSi	309LSi	309LSi	309LSi	309LSi	309LSi	SAF 2205
Sanicro 28	San 72	San 72	San 72	San 72	San 72	San 72	San 72	San 28
Sanicro 60	San 60	San 60	San 60	San 60	San 60	San 60	San 60	San 60
Ni-Cr-Fe Alloys	San 72	San 72	San 72	San 72	San 72	San 72	San 72	San 72
ASTM 444	309LSi	309LSi	309LSi	309LSi	309LSi	309LSi	309LSi	2RK65
	316LSi	316LSi	316LSi	316LSi	347	347	San 28	309LSi
5CR12	309LSi/307Mn	309LSi/307Mn	307Mn	316LSi	309LSi	309LSi	309LSi	309LSi
				347	347	347	San 28	2RK65
9% Nickel	San 72	San 72	San 72	San 72	San 72	San 72	San 72	San 72

* Not standard designation – for information only.

Warning!

All the facts concerning your intended application must be considered before careful selection is made. This selection chart is to be used as a guide only. Contact a Vulcan Stainless Welding Specialist for assistance if you require any help in selection.

Welding Consumables Selection Chart (continued)



	LDX 2101	SAF 2304 SAF 2205	Sanicro 28	Sanicro 60	Ni-Cr-Fe Alloys	ASTM 444	5CR12	9% Nickel
Carbon Steel								
Chrome Moly								
ASTM 301/302								
ASTM 304/304L								
ASTM 316/316L								
ASTM 316Ti								
ASTM 321/347								
ASTM 310/310S								
253 MA								
2RK65								
LDX 2101	23.7.L	23.7.L						
SAF 2304		SAF 2205						
SAF 2205								
Sanicro 28		San 28	San 28					
Sanicro 60	San 60	San 60	San 60	San 60	San 60			
Ni-Cr-Fe Alloys		San 72	San 72		San 72			
			San 28					
ASTM 444		309LSi SAF 2205	San 28		San 72	309LSi 316LSi		
5CR12		309LSi	San 28		San 72	309LSi 307	309LSi/307	
			San 72					
9% Nickel		San 72	San 72		San 72	San 72	San 72	San 72

Joining of Similar Materials

Parent metal ASTM/UNS/ Common name	EN	Sandvik	Welding consumable	
			Normal choice ^a	Over-alloyed choice ^a
304L ^b	1.4306 ^b	3R12 ^b	19.9.L (19.9.Nb)	19.12.3.L (19.12.3.Nb)
321 / 347 ^b	1.4541 / 1.4550 ^b	6R35 / 8R40 ^b	19.9.Nb (19.9.L)	19.12.3.Nb (19.12.3.L)
316L ^b	1.4435 ^b	3R60 ^b	19.12.3.L (19.12.3.Nb)	25.22.2.LMn
"316Ti" ^{b, c} / 318 ^b	1.4571 ^b / –	5R75 ^b / –	19.12.3.Nb (19.12.3.L)	(20.25.5.LCu)
317L	1.4438	3R64	19.13.4.L	20.25.5.LCu
310	.4845 ^b	7RE10 ^b	25.20.C	–
S30815	1.4835	253MA / 309HT ^c	22.12.HT	–
S35315	1.4854	353MA	28.34.HT	–
"310L" ^c	1.4335	2RE10	25.20.L	(25.22.2.LMn)
S31050	1.4466	2RE69	25.22.2.LMn	–
S31500	1.4417	3RE60	22.8.3.L	–
LDX2101	1.4162	–	22.8.3.L	25.10.4.L
S31803	1.4462	SAF 2205	22.8.3.L	25.10.4.L
S32304	1.4362	SAF 2304	22.8.3.L	–
S32750	1.4410	SAF 2507	25.10.4.L ^d	–
S32906	–	SAF 2906	29.8.2.L	–
N08028	1.4563	Sanicro 28	27.31.4.LCu	–
N08904	1.4539	2RK65	20.25.5.LCu	27.31.4.LCu
S31254	1.4547	254 SMO	Sanicro 60	–
Alloy 600	–	Sanicro 70	Sanicro 72HP	–
Alloy 625	–	–	Sanicro 60	–
Alloy 800	1.4876	Sanicro 31HT	Sanicro 72HP	–
Alloy 825	–	Sanicro 41	7.31.4.LCu	–

a Alternative selection within brackets.

b Also other grades with similar chemical compositions (minor variations mainly the C and/or N contents).

Stabilising element, if any, can be either Ti or Nb.

c Not standard designation. For information only.

d 25.10.4.L can also be used for the welding of other similar superduplex steels as well as for a group of 25% Cr duplex steels with PRE values between 37 and 40 – UNS S31803 / S32205 has PRE 35 and S32750 PRE >41.



Joining of Dissimilar Materials

Parent metal 1 ^a Type ASTM/UNS EN Sandvik	Parent metal 2 ^b ASTM/UNS/ Common name	Welding consumable EN
Carbon and low-alloyed steel	304L	1.4306
	321/347	1.4541/1.4550
	316L	1.4435
	"316Ti"/318	1.4571/-
	S30815	1.4835
	S35315	1.4854
	LDX2101	1.4162
	S31803	1.4462
	S32304	1.4362
	S32750	1.4410
	S32906	-
	N08028	1.4563
	N08904	1.4539
	S31254	1.4547
	Alloy 600 ^c	-
18/8	321/347	1.4541/1.4550
	316L	1.4435
	"316Ti"/318	1.4571/-
	S30815	1.4835
	S35315	1.4854
	S31803	1.4462
	S32304	1.4362
	S32750	1.4410
	S32906	-
	N08028	1.4563
	N08904	1.4539
	S31254	1.4547
	Alloy 600 ^c	-
	Alloy 600 ^c	-
	Alloy 600 ^c	-
18/8/Ti or Nb	316L	1.4435
	321/347	1.4541/1.4550
	"316Ti"/318	1.4571/-
	S30815	1.4835
	S35315	1.4854
	S31803	1.4462
	S32304	1.4362
	S32750	1.4410
	S32906	-
	N08028	1.4563
	N08904	1.4539
	S31254	1.4547
	Alloy 600 ^c	-
	Alloy 600 ^c	-
	Alloy 600 ^c	-
18/12/Mo	"316Ti"/318	1.4571/-
	S30815	1.4835
	S35315	1.4854
	S31803	1.4462
	S32304	1.4362
	S32750	1.4410
	S32906	-
	N08028	1.4563
	N08904	1.4539
	S31254	1.4547
	Alloy 600 ^c	-
	Alloy 600 ^c	-
	Alloy 600 ^c	-
	Alloy 600 ^c	-
	Alloy 600 ^c	-

Parent metal 1 ^a Type ASTM/UNS EN Sandvik	Parent metal 2 ^b ASTM/UNS/ Common name	Welding consumable EN
18/12/Mo/Ti or Nb	S30815	1.4835
	S35315	1.4854
	"316Ti"/318	1.4462
	1.4571/-	S32304
	5R75	S32750
	S32906	-
	N08028	1.4563
	N08904	1.4539
	S31254	1.4547
	S32750	1.4410
	LDX2101	S32906
	1.4162	N08028
	N08904	1.4539
	S31254	1.4547
	Alloy 600 ^c	-
Duplex	S32750	1.4410
	S31803	S32906
	1.4462	N08028
	SAF 2205	N08904
	S31254	1.4547
	Alloy 600 ^c	-
	S32750	1.4410
	S32304	S32906
	1.4362	N08028
	SAF 2304	N08904
	S31254	1.4547
	Alloy 600 ^c	-
	Superduplex	N08028
	S32750	N08904
	1.4410	S31254
Superduplex	SAF 2507	Alloy 600 ^c
	S32906	N08028
	-	S31254
	SAF 2906	Alloy 600 ^c
	20/25/5	N08028
	N08904	S31254
	1.4539	Alloy 600 ^c
	2RK65	-
	20/18/6	N08028
	S31254	Alloy 600 ^c
	1.4547	-
	254 SMO	-
	27/31/4	Alloy 600 ^c
	N08028	-
	1.4563	-
	Sanicro 28	-

a Each group of stainless steels is also valid for other grades with similar compositions.

b Also other steels with similar compositions.

c Represents a whole group of Ni/Cr and Ni/Cr/Mo alloys, such as Alloy 625, Alloy 800 and Alloy 825.

Shielding Gases

Gas	Parent metal					
	Austenitic	Duplex	Ferritic	High-alloy austenitic	Super-duplex	Nickel alloys

MIG welding

Ar	(•)	(•)	(•)	•	• a	•
He	(•)	(•)	(•)	•	• a	•
Ar + He	(•)	(•)	(•)	•	• a	•
Ar + (1-3)% O ₂	• b	• b	• b	• c	• b	
Ar + (1-3)% CO ₂ ^d	• e	• e	• e	• c	• e	
Ar + 30% He + (1-3)% O ₂	• f	• f	• f	• c	• f	
Ar + 30% He + (1-3)% CO ₂ ^d	• f	• f	• f	• c	• f	
Ar + 30% He + (1-2)% N ₂				• g	•	

TIG welding

Ar	•	•	•	•	•	
He	•	•	•	•	•	•
Ar + He	•	•	•	•	•	• h
Ar + (2-5)% H ₂	• i			• i		• i
Ar + (1-2)% N ₂		•			•	
Ar + 30% He + (1-2)% N ₂		•			•	

a Ar preferably in pulsed MIG welding

b Higher fluidity of the molten pool than with Ar

c Except for 22.12.HT and 27.31.4.LCu where Ar is preferred

d Not to be used in spray-arc welding where extra low carbon is required

e Higher fluidity of the molten pool than with Ar. Better short-arc welding properties than with Ar + (1-3)% O₂

f Higher fluidity of the molten pool than with Ar. Better short-arc welding properties than with Ar + (1-3)% CO₂ g For nitrogen alloyed grades

h Ar + 30% He improves flow compared with Ar

i Preferably for automatic welding. High welding speed. Risk of porosity in multi-run welds.

