



Contents

MIG Wire.....	128
TIG Wire	129
MMA Flux Coated Electrodes.....	130
Submerged Arc Welding Wire.....	131
Flux Cored Wire.....	131
Welding Consumables Selection Chart	132
Joining Of Similar Materials.....	134
Joining of Dissimilar Materials.....	135
Shielding Gases.....	136

MIG Wire

For gas metal arc welding manufactured to AWS A5.9

Grades: 307, 308LSI, 309LSI, 316LSI, 253MA, 2101, 2209LSI, SAF2507

Unit of Supply: Each



WWSM

Product Code	Product Size (mm)	Description	Weight ea (kg)
G307			
WWSM100G30715KG	1.0mm	MIG WIRE G307MN - 18.8.MN	15.00
WWSM120G30715KG	1.2mm	MIG WIRE G307MN - 18.8.MN	15.00
G308L			
WWSM088G308L15KG	0.88mm	MIG WIRE G308LSI - 19.9.LSI	15.00
WWSM120G308L15KG	1.2mm	MIG WIRE G308LSI - 19.9.LSI	15.00
G309L			
WWSM089G309LSI15KG	0.889mm	MIG WIRE G309LSI - 24.13.LSI	15.00
WWSM120G309LSI15KG	1.2mm	MIG WIRE G309LSI - 24.13.LSI	15.00
G316L			
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
G2101			
WWSM100GLDX15KG	1.0mm	MIG WIRE G2101 - 23.37.L	15.00
G2209L			
WWSM089G220915KG	0.89mm	MIG WIRE G2209LSI - 22.8.3.LSI	15.00
WWSM100G220915KG	1.0mm	MIG WIRE G2209LSI - 22.8.3.LSI	15.00
WWSM120G220915KG	1.2mm	MIG WIRE G2209LSI - 22.8.3.LSI	15.00
G2507			
WWSM100G250715KG	1.0mm	MIG WIRE G2507 - 25.10.4.L	15.00
WWSM120G250715KG	1.2mm	MIG WIRE G2507 - 25.10.4.L	15.00
G253MA			
WWSM089G253MA15KG	0.889mm	MIG WIRE G253MA - 22.12.HT	15.00
WWSM120G253MA15KG	1.2mm	MIG WIRE G253MA - 22.12.HT	15.00

A demand for better productivity and lower production costs drives a trend within the welding industry towards the increased use of mechanised welding methods. This calls for automatic welding wire of higher quality, especially concerning feeding and welding properties. However, the development must not lead to impaired weld deposit, corrosion resistance or strength.

Achieving this delicate balance has been the challenge for global experts in steel melting, wire production and R&D. By mastering the micro metallurgy and the wire drawing techniques collated through production, a material with excellent and consistent properties from delivery to delivery – a prerequisite for improved productivity. All properties are thoroughly tested in thorough welding laboratories.



Other grades and sizes available on request

TIG Wire

For gas tungsten arc welding AWS A5.9

Grades: 308LSI, 309LSI, 312, 316LSI, 2209L, 2507, 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			
WWST120G309LSI+5KG	1.2mm	TIG WIRE G309LSI - 24.13.LSI	5.00
WWST160G309LSI+5KG	1.6mm	TIG WIRE G309LSI - 24.13.LSI	5.00
WWST240G309LSI+5KG	2.4mm	TIG WIRE G309LSI - 24.13.LSI	5.00
G312			
WWST240G312+5KG	2.4mm	TIG WIRE G312 - 29.9	5.00
G316L			
WWST089G316LSI+5KG	0.889mm	TIG WIRE G316LSI - 19.12.3.LSI	5.00
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			
WWST120G2209L+5KG	1.2mm	TIG WIRE G2209L - 22.8.3.L	5.00
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
G2507			
WWST160G2507+5KG	1.6mm	TIG WIRE G2507 - 25.10.4.L	5.00
WWST200G2507+5KG	2.0mm	TIG WIRE G2507 - 25.10.4.L	5.00
WWST240G2507+5KG	2.4mm	TIG WIRE G2507 - 25.10.4.L	5.00
WWST320G2507+5KG	3.2mm	TIG WIRE G2507 - 25.10.4.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, E312, E316L, 253MA/309HT, SAF2205, SAF2507

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
WWSE400G308L+5.4KG	4.0mm x 5.4KG PKT	ELECTRODES 308L - 19.9.LR	5.40
G309L			
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
G312			
WWSE250G312+1.6KG	2.5mm x 1.6KG PKT	ELECTRODES 312 - 29.9.R	1.60
G316L			
WWSE325G316L+4.3KG	3.25mm x 4.3KG PKT	ELECTRODES 316L - 19.12.3.LR	4.30
WWSE320G316L+4KG	3.2mm x 4.0KG PKT	ELECTRODES 316L - 19.12.3.LR	4.00
G253MA/309HT			
WWSE250G253MA+3.5KG	2.5mm x 3.5KG PKT	ELECTRODES 253MA/309HT - 22.12.HTR	3.50
WWSE320G253MA+4KG	3.2mm x 4.0KG PKT	ELECTRODES 253MA/309HT - 22.12.HTR	4.00
WWSE400G253MA+4KG	4.0mm x 4.0KG PKT	ELECTRODES 253MA/309HT - 22.12.HTR	4.00
G2205			
WWSE250G2205+1.7KG	2.5mm x 1.7KG PKT	ELECTRODES SAF2205 - 22.9.3.LR	1.70
WWSE320G2205+4.3KG	3.2mm x 4.3KG PKT	ELECTRODES SAF2205 - 22.9.3.LR	4.30
WWSE400G2205+4.3KG	4.0mm x 4.3KG PKT	ELECTRODES SAF2205 - 22.9.3.LR	4.30
G2507			
WWSE325G2507+4KG	3.25mm x 4KG PKT	ELECTRODES SAF2507 - 25.10.4.LR	4.00

Manual metal arc welding with covered electrodes (MMA) is an all-round welding method. Although it is comparatively slow, it is an important complement to modern welding processes. MMA is for instance often the best suited method for assembly and repair work and it is the only welding process that can be used outdoors without special weld protective measures.

Vulcan Stainless have available a range of covered electrodes, which are adapted to the parent metals. The easy-to-weld electrodes ensure that the required weld-metal properties are met. In tandem our large programme of rutile and basic electrodes covers most standard and special stainless steels and nickel alloys.



Other grades and sizes available on request

Submerged Arc Welding Wire

AWS A5.9 – subject to mill lead time

Grades: 308L, 316L, 2209L, 2507

Unit of Supply: Each



WWSS

Product Code	Product Size (mm)	Description	Weight ea (kg)
G308L			
WWSS240G308L28KG	2.0mm - 28.0KG	SUB ARC WIRE G308L - 19.9.L	28.00
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			
WWSS200G220928KG	2.0mm - 28.0KG	SUB ARC WIRE G2209 - 22.8.3.L	28.00
WWSS240G220928KG	2.4mm - 28.0KG	SUB ARC WIRE G2209 - 22.8.3.L	28.00
WWSS320G220928KG	3.2mm - 28.0KG	SUB ARC WIRE G2209 - 22.8.3.L	28.00
G2507			
WWSS240G250728KG	2.4mm - 28.0KG	SUB ARC WIRE G2507 - 25.10.4.L	28.00

Flux Cored Wire

For gas covered, flux cored arc welding

AWS A5.22 ASME SFA 5.22

Grades: 309LVT, 316LVT, 2209LT

Unit of Supply: Each

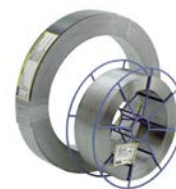


WWSF

Product Code	Product Size (mm)	Description	Weight ea (kg)
G308LVT			
WWSF120G308LVT+15KG	1.2mm x 15.0KG SPOOL	FLUX CORE WIRE 308LVT - 24.13.LT	15.00
G309LT			
WWSF120G309LVT+15KG	1.2mm x 15.0KG SPOOL	FLUX CORE WIRE 309LT - 24.13.LT	15.00
G316LVT			
WWSF120G316LVT+15KG	1.2mm x 15.0KG SPOOL	FLUX CORE WIRE 316LVT - 19.12.3.LVT	15.00
G2209LT			
WWSF120G2209LT+15KG	1.2mm x 15.0KG SPOOL	FLUX CORE WIRE 2209LT - 22.9.3.LT	15.00

Other grades and sizes available on request

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.

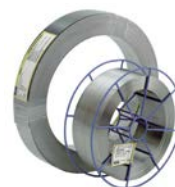
	Carbon	Chrome	ASTM	ASTM	ASTM	ASTM	Sandvik	Sandvik
	Steel	Moly	301/302	316/316L	321	310	253MA	2RK65
			304/304L	316Ti	347	310S	(309 HT)*	
Carbon Steel	E4113							
Chrome Moly	E4818	E8018						
ASTM 301/302	309L	309L	308LSi					
ASTM 304/304L	309LSi	309LSi	308LSi					
ASTM 316/316L	309LSi	309LSi	316LSi	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			
Sandvik 253 MA	309LSi	309LSi	253MA	253MA	253MA	253MA	253MA	
(309 HT)*	309LSi	309LSi	347	309LSi	347	310	309LSi	
Sandvik 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
Sandvik SAF 2304	SAF 2205	SAF 2205	SAF 2205	SAF 2205	SAF 2205	SAF 2205	SAF 2205	SAF 2205
Sandvik SAF 2205	309LSi	309LSi	309LSi	309LSi	309LSi	309LSi	309LSi	SAF 2205
Sandvik Sanicro 28	San 72	San 72	San 72	San 72	San 72	San 72	San 72	San 28
Sandvik 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
Sandvik 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	Sandvik SAF 2304 SAF 2205	Sandvik Sanicro 28	Sandvik Sanicro 60	Ni-Cr-Fe Alloys	ASTM 444	Sandvik 5CR12	9% Nickel
Carbon Steel								
Chrome Moly								
ASTM 301/302								
ASTM 304/304L								
ASTM 316/316L								
ASTM 316Ti								
ASTM 321/347								
ASTM 310/310S								
Sandvik 253 MA								
Sandvik 2RK65								
LDX 2101	23.7.L	23.7.L						
Sandvik SAF 2304		SAF 2205						
Sandvik SAF 2205								
Sandvik Sanicro 28		San 28	San 28					
Sandvik 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		
Sandvik 5CR12		309LSi	San 28 San 72		San 72	309LSi 307	309LSi/307	
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
	304L	1.4435
	1.4306	"316Ti"/318
	3R12	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	-
18/8/Ti or Nb	316L	1.4435
	321/347	"316Ti"/318
	1.4541/1.4550	1.4571/-
	6R35/8R40	S30815
	S35315	1.4835
	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/-
	316L	S30815
	1.4435	S35315
	3R60	S31803
	S32304	1.4462
	S32750	1.4362
	S32906	1.4410
	N08028	-
	N08904	1.4563
	S31254	1.4539
	Alloy 600 ^c	1.4547
	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	S31803
	1.4571/-	S32304
	5R75	S32750
	S32906	-
	N08028	1.4563
	N08904	1.4539
	S31254	1.4547
	S32750	1.4410
	S32906	-
	N08028	1.4563
	N08904	1.4539
	S31254	1.4547
	Alloy 600 ^c	-
Duplex	S32750	1.4410
	S32906	-
	1.4162	N08028
	N08904	1.4539
	S31254	1.4547
	Alloy 600 ^c	-
	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
Duplex	S32304	S32906
	1.4362	N08028
	SAF 2304	N08904
	S31254	1.4547
	Alloy 600 ^c	-
	N08028	1.4563
	S32750	N08904
	1.4410	S31254
	SAF 2507	Alloy 600 ^c
	S32906	N08028
	-	N08904
	SAF 2906	S31254
	20/25/5	N08028
	N08904	S31254
	1.4539	Alloy 600 ^c
Superduplex	2RK65	N08028
	20/18/6	N08028
	S31254	Alloy 600 ^c
	1.4547	Alloy 600 ^c
	254 SMO	Alloy 600 ^c
	27/31/4	Alloy 600 ^c
	N08028	-
	1.4563	-
	Sanicro 28	-
	Sanicro 60	-
	Sanicro 60	-
	Sanicro 60	-
	Sanicro 60	-
	Sanicro 60	-
	Sanicro 60	-

- 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.

