Stainless steel welding

INTERKABEL®

TYPE	GRADES	CLASSIFICATION EN ISO 14343-A (EN 12072)	CLASSIFICATION AWS A5.9	WERKSTOFF NUMBER	CHEMICAL COMPOSITION % mass (TYPICAL) single value means maximum value C	Si	Mn	P	S	Cr	Ni	Mo	N	Cu	Nb	other	ALL-WELD METAL MINIMUM MECHANICAL PROPERTIES Rp 0.2 (Mpa)	Rm (Mpa)	A (%)	PWHT	APPROVALS TÜV MIG	TIG	SCHIELDING GAS EN 439 MIG	TIG	DESCRIPTION / APPLICATIONS
MARTENSITIC / FERRITIC TYPES	ER 410 SGB	13	ER410	1.4009	0,15	1,0	1,0	0,03	0,02	12,0 15,0	0,3	0,3	--	0,3	--	--	250	450	15	YES	--	--	M13	I1	Air hardening stainless steel filler metal. Preheat and postheat treatments are required to obtain welds of adequate ductility. Used for welding of similar parent metals and for deposition of overlays on carbon steels to resist corrosion, erosion or abrasion
	ER 410 NiMo SGB	13 4	ER410 NiMo	1.4351	0,05	1,0	1,0	0,03	0,02	11,00 14,00	3,0 5,0	0,4	--	0,3	--	--	500	750	15	YES	--	--	M13	I1	Stainless steel filler metal used for welding parents metals like AISI 410, AISI 410S or AISI 405. It is designed to eliminate or to contain ferrite in the weld zone. Final PWHT should not exceed 620°C because higher temperatures may result in rehardening due to untempered martensite after cooling to room temperature
	ER 420 SGB	--	ER420	--	0,25 0,40	0,5	0,6	0,03	0,03	12,0 14,0	0,75	0,75	--	0,75	--	--	250	450	15	YES	--	--	M13	I1	Stainless steel filler metal similar to ER410 SGB except for the higher carbon content. It guarantees higher surface hardness of the weld deposit than ER410 SGB, increasing wear and abrasion resistance
	ER 430 SGB	17	ER430	1.4015	0,12	1,0	1,0	0,03	0,02	16,0 19,0	0,3	0,3	--	0,3	--	--	300	450	15	YES	--	--	M12 M13	I1	Stainless steel filler metal suitable for facings resistant to wear and oxidation at high temperature, or welding similar parent metals. It usually requires preheating treatments
AUSTENITIC TYPES	ER 308L SGB	19 9 L	ER308L	1.4316	0,03	0,65	1,0 2,5	0,03	0,02	19,0 21,0	9,0 11,0	0,3	--	0,3	--	--	320	510	30	NO	--	X	M13	I1	Austenitic stainless steel filler metal suitable for welding parent metals like AISI 304, AISI 304L. Low carbon content reduces the possibility of intergranular carbide precipitation and therefore it increases the resistance to intergranular corrosion
	ER 308LSi SGB	19 9 LSi	ER308LSi	(1.4316)	0,03	0,65 1,2	1,0 2,5	0,03	0,02	19,0 21,0	9,0 11,0	0,3	--	0,3	--	--	320	510	30	NO	X	--	M12 M13	I1	Austenitic stainless steel filler metal suitable for welding parent metals like AISI 304, AISI 304L. Equivalent to ER308L SGB except for higher Si content. This improves the arc stability, the weld metal fluidity and the melt run appearance. If the dilution by the parent metal produces a low ferrite or fully austenitic weld, the hot cracking sensitivity of the weld is higher than that of a lower Si content weld metal
	ER 347Si SGB	19 9 Nb Si	ER347Si	(1.4551)	0,08	0,65 1,2	1,0 2,5	0,03	0,02	19,0 21,0	9,0 11,0	0,3	--	1,3	10xC to 1,0	--	350	550	25	NO	--	--	M12 M13	I1	Austenitic stainless steel filler metal Nb added as stabilizer with higher Si content, suitable for welding Cr-Ni stainless parent metals of similar composition stabilized with either Nb, Ti or Ta (type AISI 347, AISI 321). The addition of Nb reduces the possibility of intergranular Cr carbide precipitation and thus susceptibility to intergranular corrosion. The higher Si content improves the arc stability, the weld metal fluidity and the melt run appearance. If the dilution by the parent metal produces a low ferrite or fully austenitic weld, the hot cracking sensitivity of the weld is higher than that of a lower Si content weld metal
	ER 316L SGB	19 12 3 L	ER316L	1.4430	0,03	0,65	1,0 2,5	0,03	0,02	18,0 20,0	11,0 14,0	2,5 3,0	--	0,3	--	--	320	510	25	NO	--	X	M12 M13	I1	Austenitic stainless steel filler metal suitable for welding parent metals like AISI 316, AISI 316L. Low carbon content reduces the possibility of intergranular carbide precipitation and therefore it increases the resistance to intergranular corrosion. It guaranties better corrosion resistance than ER308L SGB
	ER 316LSi SGB	19 12 3 L Si	ER316LSi	(1.4430)	0,03	0,65 1,2	1,0 2,5	0,03	0,02	18,0 20,0	11,0 14,0	2,5 3,0	--	0,3	--	--	320	510	25	NO	X	--	M12 M13	I1	Austenitic stainless steel filler metal suitable for welding parent metals like AISI 316, AISI 316L. Equivalent to ER316L SGB except for higher Si content. This improves the arc stability, the weld metal fluidity and the melt run appearance. If the dilution by the parent metal produces a low ferrite or fully austenitic weld, the hot cracking sensitivity of the weld is higher than that of a lower Si content weld metal. It guaranties better corrosion resistance than ER308LSi SGB
	ER 318 SGB	19 12 3 Nb	ER318	1.4576	0,08	0,65	1,0 2,5	0,03	0,02	18,0 20,0	11,0 14,0	2,5 3,0	--	0,3	10xC to 1,0	--	350	550	25	NO	--	--	M12 M13	I1	Austenitic stainless steel filler metal Nb added as stabilizer, suitable for welding parent metals of similar composition like AISI 316Ti. The addition of Nb reduces the possibility of intergranular Cr carbide precipitation and thus susceptibility to intergranular corrosion
	ER 317L SGB	(18 15 3 L)	ER317L	--	0,03	0,65	1,0 2,5	0,03	0,03	18,5 20,5	13,0 15,0	3,0 4,0	--	0,75	--	--	300	480	25	NO	--	--	M12 M13	I1	Austenitic stainless steel filler metal suitable for welding parent metals of similar composition, in corrosive enviroments where crevice and pitting corrosion are of concern, with high acids and chlorides concentration
AUSTENITIC FERRITIC TYPES	ER 2209 SGB	22 9 3 N L	ER2209	--	0,03	1,0	2,5	0,03	0,02	21,0 24,0	7,0 10,0	2,5 4,0	0,10 0,20	0,3	--	--	450	550	20	NO	--	--	I3 - M12 M13	I1	Austenitic – ferritic stainless steel filler metal suitable for welding duplex parent metals. The weld deposit is characterized by high tensile strength, resistance to stress corrosion cracking and improved resistance to pitting, in corrosive enviroments with high acids and chlorides concentration
	ER 25 9 4NL SGB	25 9 4 N L	--	--	0,03	1,0	2,5	0,03	0,02	24,0 27,0	8,0 10,5	2,5 4,5	0,20 0,30	1,5	--	W 1,0	550	620	18	NO	--	--	I3 - M12 M13	I1	Austenitic – ferritic stainless steel filler metal suitable for welding duplex parent metals. The weld deposit is characterized by high tensile strength, resistance to stress corrosion cracking and improved resistance to pitting, in corrosive enviroments with high acids and chlorides concentration
FULLY AUSTENITIC TYPE	ER 385 SGB	20 25 5 Cu L	ER385	--	0,03	1,0	1,0 4,0	0,03	0,02	19,0 22,0	24,0 27,0	4,0 6,0	--	1,0 2,0	--	--	320	510	25	NO	--	--	M12 M13	I1	Austenitic – ferritic stainless steel filler metal suitable for welding super duplex parent metals. The weld deposit is characterized by higher tensile strength, resistance to stress corrosion cracking and improved resistance to pitting than ER2209 SGB type
SPECIAL TYPES	ER 309L SGB	23 12 L	ER309L	1.4332	0,03	0,65	1,0 2,5	0,03	0,02	22,0 25,0	11,0 14,0	0,3	--	0,3	--	--	320	510	25	NO	--	--	M12 M13	I1	Austenitic stainless steel filler metal suitable for welding different parent metals like AISI 304 to carbon steels or similar steels in wrought and cast form. It can be used to weld AISI 304 and similar parent metals where severe corrosion conditions exist requiring higher alloy weld metal. Low carbon content reduces the possibility of intergranular carbide precipitation and therefore it increases the resistance to intergranular corrosion
	ER 309LSi SGB	23 12 L Si	ER309LSi	(1.4332)	0,03	0,65 1,2	1,0 2,5	0,03	0,02	22,0 25,0	11,0 14,0	0,3	--	0,3	--	--	320	510	25	NO	X	--	M12 M13	I1	Austenitic stainless steel filler metal suitable for welding different parent metals like AISI 304 to carbon steels or similar steels in wrought and cast form. It can be used to weld AISI 304 and similar parent metals where severe corrosion conditions exist requiring higher alloy weld metal. Equivalent to ER309L SGB except for higher Si content. This improves the arc stability, the weld metal fluidity and the melt run appearance. If the dilution by the parent metal produces a low ferrite or fully austenitic weld, the hot cracking sensitivity of the weld is higher than that of a lower Si content weld metal
	ER 307 SGB	--	ER307	1.4370	0,04 0,14	0,65	3,3 4,8	0,03	0,03	19,5 22,0	8,0 10,7	0,5 1,5	--	0,75	--	--	350	590	25	NO	X	X	M13	I1	Austenitic stainless steel filler metal suitable for welding dissimilar steels like austenitic manganese steel and carbon steel. It is often used as weld layer before making the hard facing
	ER 309LMo SGB	23 12 2 L	ER30LMo	--	0,03	1,0	1,0 2,5	0,03	0,02	21,0 25,0	11,0 15,5	2,0 3,5	--	0,3	--	--	350	550	25	NO	--	--	M12 M13	I1	Austenitic stainless steel filler metal similar to ER309L SGB except for the addition of 2,0 to 3,0 Mo percent to increase pitting corrosion resistance in halide containing enviroments. It is primary used for surfacing of parent metals to improve their corrosion resistance. In multilayer overlays, ER309LMo SGB is usually needed for the first layer in order to achieve low carbon contents in successive layers with filler metals such as ER316L SGB or ER317L SGB
	ER 312 SGB	29 9	ER312	1.4337	0,15	1,0	1,0 2,5	0,03	0,02	28,0 32,0	8,0 12,0	0,3	--	0,3	--	--	450	650	15	NO	--	--	M12 M13	I1	Austenitic stainless steel filler metal similar to ER309L SGB except for the addition of 2,0 to 3,0 Mo percent to increase pitting corrosion resistance in halide containing enviroments. It is primary used for surfacing of parent metals to improve their corrosion resistance. In multilayer overlays, ER309LMo SGB is usually needed for the first layer in order to achieve low carbon contents in successive layers with filler metals such as ER316L SGB or ER317L SGB
HEAT RESISTING TYPES	ER 310 SGB	25 20	ER310	1.4842	0,08 0,15	2,0	1,0 2,5	0,03	0,02	24,0 27,0	18,0 22,0	0,3	--	0,3	--	--	350	550	20	NO	--	--	M13	I1	Fully austenitic stainless steel filler metal suitable for welding parent metals of similar composition. The weld deposit guarantees high temperature resistance in oxidizing atmospheres

Packaging Type		Wire range diameters (mm)	Inner packaging diameter (mm)	Outer packaging diameter (mm)	Number of pieces per packaging	Weight (Kg)	Winding type
	D200	0,80 ÷ 1,20	52	200	180 spools every pallet	5	Precision layer
	D300	0,80 ÷ 1,60	52	300	60 spools every pallet	15	Precision layer
	K300	0,80 ÷ 1,60	52	300	60 spools every pallet	15	Precision layer
	S415	2,00 ÷ 4,00	305	406	36 spools every pallet	55	Precision layer
	DRUM	0,80 ÷ 1,20	500	510	2 drums every pallet	120	Straight wire
	RODS	1,00 ÷ 4,00 (lenght 1 m)	-	-	-	5	-

TECHICAL NOTE: Trafilerie Brambilla S.p.A. MIG filler metal presents optimum cast, helix and surface condition to guarantee the best feedabilty and the best arc stability in semiautomatic and automatic welding

WELDING FILLER METAL SPECIFIC TO	Available diameters (mm)							
	0,8	1,0	1,2	1,6	2,0	2,4	3,2	4,0
MIG, PLASMA, PLASMA MIG, LASER								
TIG								
SUBMERGED ARC								