

sij | elektrode

STAINLESS
STEEL WELDING
CONSUMABLES



Reliability, flexibility,
knowledge, innovation

SIJ is a vertically integrated holding company, the leading steel manufacturer in Slovenia, and one of the largest stainless and special steel manufacturers in Europe. SIJ Group consists of the two largest steel companies in Slovenia (Acroni and Metal Ravne), other manufacturing and processing companies (Noži Ravne, Elektrode, SUZ), specialized service and sales centers across Europe and the USA, and companies for scrap steel collection and sales.





Elektrode Jesenice is the largest manufacturer of welding materials in Slovenia, and a prominent one in Europe. More than 70 years of experience combined with continuous development and close cooperation with our customers, make Elektrode a reliable partner when it comes to welding consumables. We manufacture welding materials for manual, semi-automatic and automatic robotic welding of all steel types. Our broad range of products contains all kinds of welding wires, electrodes, flux-cored wires and fluxes.

Development partner

SIJ Elektrode is not just a producer of welding materials, but development partner to its customers, offering:

- **Optimal choice of welding materials**
- **Assistance with welding processes**
- **Technical support at all stages of cooperation**

Quality driven

Our certified in-house laboratory allows us to carry out mechanical and metallographical testing in accordance with the applicable standards EN, ISO, DIN, and AWS ensuring constant quality level.

Numerous certificates and customer references are guarantee for consistent quality of our products, which meet even the most stringent requirements.

Numerous certifications

We are iso 9001:2008 certified company with numerous approvals.

- TÜV SUD Industrie Service
- DB Deutsche Bahn
- LR Lloyd's Register
- GL Germanischer Lloyd
- DNV Det Norske Veritas
- BV Bureau Veritas

Wide product range

- Solid MAG wires G3Si1, G4Si1
- MIG wires ER100S-1, ER120S-G
- Welding wires for special purpose ER70S-2, ER80S-Ni1, ER80S-G
- Seamless FCW flux cored wires
- MIG/TIG wires for high alloyed steels
- Low alloyed rutile and basic electrodes
- High alloyed INOX electrodes
- Cr, Ni, Mo medium alloyed electrodes
- Hardfacing and cast iron electrodes
- Wires and fluxes for SAW

Our products are used in oil and gas, off shore and pipeline, chemical processing, automotive, agro machinery, heavy transportation, lifting, excavating and mining, energy and power, railways and shipyards, maintenance and repair, construction and other industry sectors.

Austenitic stainless steels



W.Nr.

AWS

EN 1600
EN 12072
EN 760

WELDING
CONSUMABLES
ELEKTRODE JESENICE

STEEL

W.Nr.	EN	AWS	*	
1.4301	X5CrNi18-10	304	AUSTENITIC	
1.4306	X2CrNi19-11	304L		
1.4307	X2CrNi18-9			
1.4310	X10CrNi18-8	301		
1.4311	X2CrNiN18-10	304LN		
1.4315	X5CrNiN19-9	304N		
1.4541	X5CrNiTi18-10	321		
1.4550	X6CrMnNb18-10	347		
		347H		
1.4878	X8CrNiTi18-10	321H		
1.4948	X6CrNi18-10	304H		
1.4401	X5CrNiMo17-12-2	316		AUSTENITIC STEEL GRADES WITH MO
1.4404	X2CrNiMo17-12-2	316L		
1.4432	X2CrNiMo17-12-3			
1.4435	X2CrNiMo18-14-3			
1.4436	X3CrNiMo17-13-3	316		
1.4429	X3CrNiMo17-13-3	316 LN		
1.4919		316H		
1.4438	X2CrNiMo18-15-2	317L		
1.4571	X6CrNiMoTi17-12-2	316Ti		
1.4580	X6CrNiMoTi17-12-2	316Cb		

Ferritic stainless steels

STEEL				WELDING CONSUMABLES ELEKTRODE JESENICE				AWS		W.Nr.		electrodes		wires / rods		wires / fluxes		electrodes		wires / rods		wires / fluxes		electrodes	
								EN 1600		EN 12072		EN 760		308L		1.3416		308LSI		1.3416		308L		1.3416	
W.Nr.	EN	AWS	*	INOX R 19/9NC	MIG 19/9 NC Si	TIG 19/9 NC Si	EPP 19/9NC/ flux FB CrNi	INOX R 19/9 Nb	INOX B 19/9 Nb	MIG 19 9 Nb Si	TIG 19 9 Nb Si	EPP 19/9Nb/ flux FB CrNi	INOX R 19/ 12/3NC												
1.4000	X6Cr13	410S		•	•	•	•	•	•	•	•	•	•												
1.4003	X6Cr13	410S		•	•	•	•	•	•	•	•	•	•												
1.4016	X6Cr17	430		•	•	•	•	•	•	•	•	•	•												
1.4113	X6CrMo17-1	434		•	•	•	•	•	•	•	•	•	•												
1.4313	X3CrNiMo13-4			•	•	•	•	•	•	•	•	•	•												
1.4509	X2CrTiNb18			•	•	•	•	•	•	•	•	•	•												
1.4510	X3CrTi17	439		•	•	•	•	•	•	•	•	•	•												
1.4511	X3CrNb17			•	•	•	•	•	•	•	•	•	•												
1.4512	X2CrTi12	409		•	•	•	•	•	•	•	•	•	•												

Remarks: • most appropriate material, or material the most similar to steel
 • conditionally acceptable
 * Type of stainless steel

Martensitic and other stainless steels

				Electrodes				wires / rods		electrodes	wires / rods	
W.Nr.				1.4820	1.4820	1.4842	1.4842	1.4842	1.4842	1.4332	1.4332	1.4332
AWS				446	446	310	310	310	310	309L	309LSi	309LSi
EN 1600 EN 12072 EN 760 EN 12072				E 25 4 B 43	E 25 4 R 43	E 25 20 B 42	E 25 20 R 42	G 25 20	W 25 20	E 23 12 IR 12	G 23 12 L Si	W 23 12 L Si
STEEL				WELDING CONSUMABLES ELEKTRODE JESENICE								
W.Nr.	EN	AWS	Type of stainless steel	INOX B 25/4 Fe	INOX R 25/4 Fe	INOX B 25/20	INOX R 25/20	MIG 25/20	TIG 25/20	INOX R 25/14NC	MIG 25/14NC Si	TIG 25/14NC Si
1.4713	X10CrAlSi7		FERRITIC		x	x						
1.4724	X10CrAlSi13			x	x	•				•	•	•
1.4742	X10CrAlSi18			x	x	•				•	•	•
1.4746								x	x	x		
1.4749	X18CrN28			x	x	•		•	•			
1.4762	X10CrAlSi25	446		x	x	•		•	•			
1.4462	X2CrNiN23-4	2205	DUPLEX									
1.4362	X2CrNiMoN22-5-3	2304										
1.4410	X2CrNiMoN25-7-4											
1.4520			S. FE.									
1.4521												
1.4006	X12Cr13	410	MARTENSITIC							x	x	x
1.4021	X20Cr13	420								x	x	x
1.4028	X30Cr13											
1.4031	X39Cr13											
1.4034	X46Cr13											
1.4116												
1.4828	X15CrNiSi20-12		HEAT RESISTANT	x		•		•		x	x	x
1.4833	X12CrNi23-13	309 / 309S		x		•		•		x	x	x
1.4835	X9CrNiSiN21-11-2			x		•		•		x	x	x
1.4841	X15CrNiSi25-21	314		x		x	x	x	x	x		
1.4845	X8CrNi25-21	310S		x		x	x	x	x	x		

Customized welding solutions by SIJ Elektrode increase welding efficiency by up to 10%

SIJ Group welding consumables produced by Elektrode are the perfect solution for welding Acroni and Metal Ravne stainless steels. Carefully developed, taking characteristics of SIJ stainless steels into consideration, our welding consumables increase the efficiency of your welding processes by up to 10%.* Combination of SIJ welding materials and steels result in a smoother welding and high precision welding flow, creating a perfect joint weld structure. Our welding solutions are suitable for even the most demanding industries and applications.

* internal testing data

When selecting welding material, care should be taken to select appropriate welding consumables with respect to their corrosion resistance, mechanical properties and the temperature of application. At SIJ Elektrode we offer full support and consultation on choice of optimal welding consumables.

During welding, it is important to consider the heat input and interpass temperature, clean surfaces, slag removal after welding, passivation, and the selection of appropriate accessories, to reduce the possibility of corrosion and cracking. Ferritic steel grades are often welded with austenitic welding material grades, while similar ferritic materials are used for cladding or for welding of steel castings. Before welding, steel can be preheated to 200°C to increase ductility. PWHT should be carried out at 780°C.

DISSIMILAR WELDING (General applications)

BASE METAL		AISI 304L 1.4301	AISI 310 1.4845	AISI 316L 1.4404	AISI 321 1.4514	ACRONI 4835 1.4835
AISI/AWS	W.NR.					
AISI 304L	1.4301	INOX R 19/9NC	INOX R 25/14NC	INOX R 19/9NC INOX R 19/12/3NC	INOX R19/9NB	INOX R 25/14NC
AISI 310	1.4845	INOX R 25/14NC	INOX R 25/20 INOX B 25/4Fe	INOX R 25/14NC MIG 625	INOX R 25/14NC	INOX R 20/10/3L INOX R 25/14NC
AISI 316L	1.4404	INOX R 25/14/3NC	INOX R 25/14NC MIG 625	INOX R 19/12/3NC	INOX R 19/12/3NC INOX R 25/14/3NC	INOX R 25/14NC INOX R 20/10/3 L
AISI 321	1.4514	INOX R 25/14NC	INOX R 25/14NC	INOX R 25/14/3NC	INOX R19/9NB	INOX R 25/14NC INOX R 20/10/3 L
Acroni 4835	1.4835	INOX R 25/14NC	INOX R 25/14NC	INOX R 25/14NC	INOX R 25/14NC	INOX R 20/10/3L
S32101*	1.4162	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14NC
AISI 2205	1.4462	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14NC
AISI 2507	1.4410	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14NC
Alloy 625 **	2.4856	MIG 625	MIG 625	MIG 625	MIG 625	MIG 625
904L	1.4519	MIG 625	MIG 625	MIG 625	MIG 625	MIG 625
S31254	1.4547	MIG 625	MIG 625	MIG 625 INOX R 25/14/3NC	MIG 625 INOX R 25/14/3NC	MIG 625
CARBON STEEL		INOX R 25/14NC	INOX R 25/14NC	INOX R 25/14/3NC	INOX R 25/14NC	INOX R 25/14NC

Any special requirement, please contact: Sijelektrode

* S32101; W.nr.:1.4162 = Lean Duplex

** Alloy 625; W.nr.:1.4162 Wire classification : ERNiCrMo-3

Martensitic stainless steels need preheating and PWHT to prevent cold cracks. Before welding they should be preheated to 350-400°C, and PWHT should be carried out shortly after welding at 600-700°C, with slow cooling. These are most often used in production and maintenance of turbine spades, pumps, valves, axes, cutting tools, and bearings. Welding materials can be similar to the base metal, or austenitic. For manual arc welding electrodes should be basic and predried.

When welding austenitic stainless steels preheating is not necessary and the energy input should be low, at about 2 kJ/mm. Due to high temperature extension, deformations during welding can appear. Chemical composition of welding consumables should be similar to base material in order to prevent corrosion. Our recommendation when welding austenitic steels with higher carbon content is to use Nb stabilized welding consumables, such as INOX R 19/9 NC, INOX R 19/12/3NC, INOX R 19/9 Nb, INOX R19/12/3Nb, INOX R 19/13/4L, INOX B 18/8/6.

Duplex steels are characterized by good weldability. During welding process material should be at 700- 890°C for as short a time as possible, in order to avoid intermetallic phases with lower ductility. Duplex welding consumables have a small content of Ni as base metals, to prevent ferritization during welding. The energy input should be controlled at 0.5-2.5 kJ/mm.

Heat resistant stainless steels are usually welded with austenitic-ferritic welding consumables such as INOX R25/4 and are stable up to 1000°C.



S32101* 1.4162	AISI 2205 1.4462	AISI 2507 1.4410	ALLOY 625 ** 2.4856	904L 1.4519	S31254 1.4547	CARBON STEEL
INOX R 25/14/3NC	INOX R 25/14/3NC	INOX R 25/14/3NC	MIG 625	MIG 625	MIG 625	INOX R 25/14NC
INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	MIG 625	INOX R 25/14NC INOX R 20/25L	INOX R 25/20 MIG 625	INOX R 25/14NC
INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	MIG 625	MIG 625 INOX R 20/25L	INOX R25/14/3NC MIG 625	INOX R 25/14NC INOX R 25/14/3NC
INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R25/14/3NC INOX R 22/9/3LN	MIG 625	MIG 625	MIG 625	INOX R 25/14NC
INOX R 25/14NC INOX R 22/9/3LN	INOX R 25/14NC INOX R 22/9/3LN	INOX R 25/14NC INOX R 22/9/3LN	MIG 625	INOX R 25/14NC MIG 625	INOX R 25/14NC MIG 625	INOX R 25/14NC
INOX R 25/4Fe INOX R 22/9/3 LN	INOX R 22/9/3LN	INOX R 22/9/3LN	INOX R 25/14NC	INOX R25/14NC INOX R25/14/3NC	INOX R25/14NC INOX R25/14/3NC	INOX R 25/14/3NC INOX R 22/9/3LN
INOX R 25/4Fe INOX R 22/9/3 LN	INOX R 22/9/3LN	INOX R 22/9/3LN	INOX R 25/14NC	INOX R 25/14NC INOX R 25/14/3NC	INOX R 25/14NC INOX R 25/14/3NC	INOX R 25/14/3NC INOX R 22/9/3LN
INOX R 25/4Fe INOX R 22/9/3 LN	INOX R 22/9/3LN	INOX R 25/14NC	INOX R 25/14NC	INOX R 25/14NC INOX R25/14/3NC	INOX R 25/14NC INOX R 25/14/3NC	INOX R 25/14/3NC INOX R 22/9/3LN
MIG 625 INOX R 22/9/3LN	MIG 625 INOX R 22/9/3LN	MIG 625 INOX R 22/9/3LN	MIG 625	INOX R 20/25L	MIG 625	MIG 625
INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	MIG 625	INOX R 20/25L	MIG 625	INOX R 25/14/3NC
MIG 625	MIG 625	MIG 625	MIG 625	MIG 625	MIG 625	MIG 625 INOX R 25/14/3NC
INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 22/9/3LN	INOX R 25/14/3NC INOX R 25/4Fe	MIG 625	MIG 625	MIG 625	Carbon steel

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