

# Filler Metals for Repair, Anti-wear and Anti-corrosion

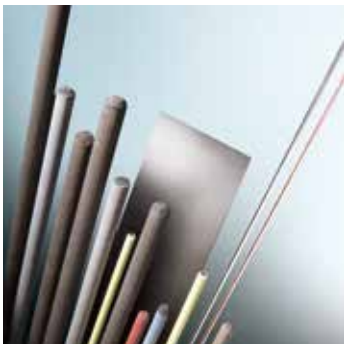


# UTP Maintenance

## Tailor-Made Protectivity™

High-quality industrial-use welding filler metals for maintenance, repair, and overlay welding. By adding the UTP and Soudokay brands to the voestalpine Böhler Welding brand network, the UTP Maintenance can look back on a proud history spanning 60 years as an innovative supplier of welding technology products. UTP Maintenance is the global leader in the repair, maintenance, and overlay welding segment.

With roots both in Bad Krozingen (Germany) and Seneffe (Belgium), UTP Maintenance offers the world's most unique product portfolio for filler metals from its own production facilities. The Soudokay brand was established back in 1938, while the UTP brand began operations in 1953. Each of these brands therefore respectively look back on a long history of international dimension.



By merging into the UTP Maintenance brand, the collective know-how of both brands – gathered over decades in the fields of metallurgy, service, and applications engineering – is now united under one umbrella. As a result, a truly unique portfolio of solutions for welding applications has been created in the fields of repair, maintenance, and overlay welding.

## Tailor-Made Protectivity™

Industry experience and applications know-how – combined with innovative and custom (tailor-made) products – guarantee that our customers obtain the ideal combination of productivity and protection, within the shortest operating times and up to the maximum performance capacity of their products. This explains UTP Maintenance's guiding principle – "Tailor-Made Protectivity™" – which puts the focus on the customer.

## Research and Development for Customized Solutions

At UTP Maintenance, research and development, conducted in collaboration with customers, plays a crucial role. Because of our strong commitment to research and development, combined with our tremendous innovative capacity, we are constantly engineering new products, and improving existing ones on an ongoing basis. The result is a vast number of innovative products for solving individual problems and complex matters.



### **Customized Products of Superior Quality**

We continuously adapt our product portfolio of about 600 products to customer and industry specifications, while ensuring that we meet the highest quality specifications.

From its in-house production facilities, UTP Maintenance delivers innovative, tailor-made welding filler metals for: unalloyed and fine-grained structural steel, low-grade alloyed steels, rust-proof, acid-proof, and heat-proof steels, nickel-based alloys, cast iron, copper and copper alloys, manganese steels, tool steels, and cobalt steels.

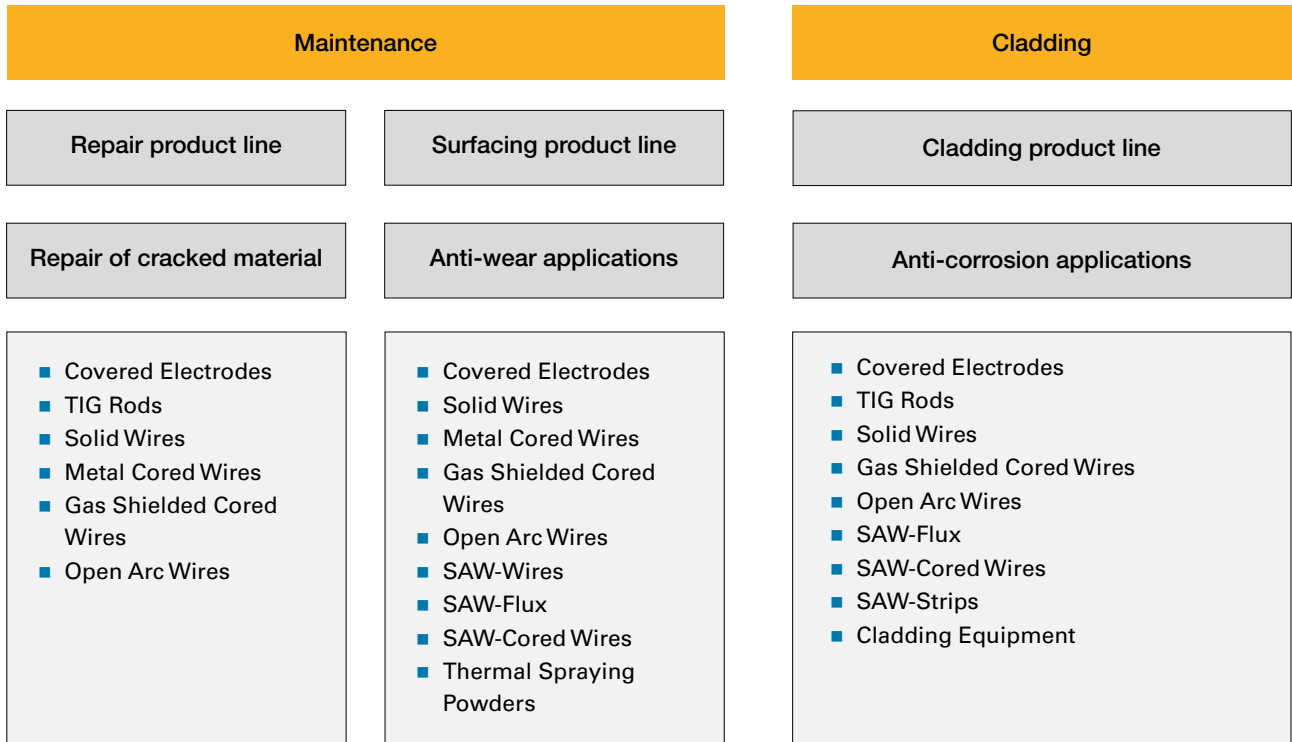
The product portfolio comprises:

- Stick electrodes
- Solid wires and rods
- Flux cored wires
- Submerged arc wires and fluxes
- Submerged arc strips and fluxes
- Spraying- and PTA-powders

### **Solutions at Every Point on the Globe**

UTP Maintenance provides products and services through the global branches of voestalpine Böhler Welding and its dealer network in more than 150 countries throughout the world. A team of welding engineers stand at the customer's side, providing advice and support in all matters related to the challenges of welding technology.

## Business Product Lines



## Industry Focus



- Agriculture & Food
- Cement
- Earth Moving
- Energy & Power
- Glass
- Mining
- Oil & Gas
- Pulp & Paper
- Pumps, Valves & Fittings
- Railway Systems
- Recycling and Waste Management
- Shipyards
- Steel Structure
- Steel Works
- Sugar & Ethanol
- Tool Construction





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# Corresponding filler metals

Covered Electrode	TIG Rod	Solid wire	Gas shielded cored wire	Open Arc wire	SAW Cored wire
UTP 610	UTP A 118	UTP A 118			
UTP 611		UTP A 119			
UTP 614 KB		UTP A 119	UTP AF152	SK BU-C1	
UTP 63	UTP A 63	UTP A 63	SK 402-G / SK 307-G	SK 402-O	SK 402-S
UTP 68 LC	UTP A 68 LC	UTP A 68 LC	UTP AF 68 LC	SK 308L-O	
UTP 68 Mo	UTP A 68 Mo	UTP A 68 Mo			
UTP 68 MoLC	UTP A 68 MoLC	UTP A 68 MoLC		SK 316L-O	
UTP 6824 LC	UTP A 6824 LC	UTP A 6824 LC	UTP AF 6824 LC	SK 309L-O	
UTP 068 HH	UTP A 68 HH	UTP A 68 HH			
UTP 6222 Mo	UTP A 6222 Mo	UTP A 6222 Mo			
UTP 83 FN	UTP A 8051 Ti		SK FNM-G	SK FN-O	
UTP 86 FN	UTP A 8051 Ti		SK FNM-G	SK FN-O	
UTP 387	UTP A 387	UTP A 387			
UTP 34 N	UTP A 34 N	UTP A 34 N			
UTP 73 G 2	UTP A 73 G 2	UTP A 73 G 2	SK D 12-G / SK D 12S-G		
UTP 73 G 3	UTP A 73 G 3	UTP A 73 G 3			
UTP 73 G 4	UTP A 73 G 4	UTP A 73 G 4	SK 734-G	SK 734-O	
UTP 690			SK 20-G		
UTP 750			SK D35-G		SK D 35-S
UTP 7200				SK 313-O	
UTP BMC			SK AP-G	SK AP-O	SK AP-S
UTP CELSIT 706			SK STELKAY 6-G	SK STELKAY 6-O	
UTP CELSIT 721			SK STELKAY 21-G		
UTP DUR 250		UTP A DUR 250	SK D250-G / SK 250-G	SK BU-O	SK BU-S
UTP DUR 350		UTP A DUR 350	SK 350-G	SK 350-O	SK 350-S
UTP DUR 600		UTP A DUR 600	UTP AF DUR 600 T / SK 600-G	SK A12-O	
UTP LEDURIT 61				SK 460-O	
UTP LEDURIT 65				SK A45-O	SK A45-S



# Covered electrodes for repair of cracked material

## Unalloyed and low alloy steels

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP 610	AWS 5.1	Yield strength RP0,2	Tensile strength Rm	Rutile cellulose coated stick electrode with very good weldability in all positions, including vertical down. Universal electrode, particularly for small transformers. Bendable covering. Versatile application in steel, vehicle etc.
	E 6013	≥ 380	470-600	
	EN ISO 2560-A	Elongation A	Impact strength KV	
	E 38 0 RC 11	≥ 20	≥ 47	
UTP 611	AWS 5.1	Yield strength RP0,2	Tensile strength Rm	UTP 611 is a strongly coated stick electrode for repair of cracked material and surfacing on all kind of steel constructions. It is used in autobody- and wagon industry, boiler construction and shipbuilding.
	E 6013	>380	>510	
	EN ISO 2560-A	Elongation A	Impact strength KV	
	E 38 0 RR 12	> 22%	>47 J	
UTP 614 Kb	AWS 5.1	Yield strength RP0,2	Tensile strength Rm	UTP 614 Kb is a double coated stick electrode with a universally suited application field. It is used in industry, trade, as well as in production and repair welds for diverse base materials
	E 7018	> 420	> 510	
	EN ISO 2560-A	Elongation A	Impact strength KV	
	E 42 3 B32 H10	> 22	> 47 (-30°)	

## Stainless Steels

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP 63	EN 14700	Yield strength RP0,2	Tensile strength Rm	With the fully austenitic UTP 63, non-alloy structural and heat-treatable steels can be welded, also in combination with austenitic CrNi steels.
	E Fe10	> 350	> 600	
	EN ISO 3581-A	Elongation A	Impact strength KV	
	E 18 8 Mn R 32	> 40	> 60	
UTP 65 D	EN 14700	Yield strength RP0,2	Tensile strength Rm	UTP 65 D has been developed to satisfy the highest requirements for repair and surfacing. It is extremely crack-resistant when joining steels of difficult weldability.
	E Z Fe11	> 640	> 800	
	EN ISO 3581-A	Elongation A		
	~ E 29 9 R 12	> 20		
UTP 68 H	AWS A5.4	Yield strength RP0,2	Tensile strength Rm	The rutile coated stick electrode UTP 68 H is suitable for repair and surfacing of heat resistant Cr-, CrSi-, CrAl-, CrNi-steels/cast steels.
	E 310-16	> 350	> 550	
	EN ISO 3581-A	Elongation A	Impact strength KV	
	E 25 20 R 32	> 30	> 47	
UTP 68 LC	AWS A5.4	Yield strength RP0,2	Tensile strength Rm	The rutile coated stick electrode UTP 68 LC, with a low carbon content, is used for repair and building up of identical low carbon, austenitic CrNi steels and CrNi cast steels.
	E 308 L - 17	> 350	> 520	
	EN ISO 3581-A	Elongation A	Impact strength KV	
	E 19 9 L R 3 2	> 35	> 47	
UTP 68 Mo	AWS A5.4	Yield strength RP0,2	Tensile strength Rm	The rutile coated stick electrode UTP 68 Mo is used for repair and surfacing of stabilized and non stabilized CrNiMo steels and CrNiMo cast steels.
	E 318 - 16	380	560	
	EN ISO 3581-A	Elongation A	Impact strength KV	
	E 19 12 3 Nb R 3 2	30	55	
UTP 68 MoLC	AWS A5.4	Yield strength RP0,2	Tensile strength Rm	The rutile coated stick electrode UTP 68 MoLC, with a low C content, is used for repair and surfacing of identical, low carbon, austenitic CrNiMo steels and CrNiMo cast steels.
	E 316 L-17	380	560	
	EN ISO 3581-A	Elongation A	Impact strength KV	
	E 19 12 3 L R 3 2	30	60	
UTP 6824 LC	AWS A5.4	Yield strength RP0,2	Tensile strength Rm	The rutile coated stick electrode UTP 6824 LC is used for repair and surfacing of stainless and heat resistant steels / cast steels as well as for dissimilar metal joints (heterogeneous joints) and for buffer layers on corrosion - or wear resistant claddings on C-steels.
	E 309 L-17	> 390	> 550	
	EN ISO 3581-A	Elongation A	Impact strength KV	
	E 23 12 L R 32	> 30	> 47	



## Nickel Alloys

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP 80 M	AWS 5.11	Yield strength RP0,2	Tensile strength Rm	UTP 80 M is suitable for repair and surfacing of nickel-copper alloys and of nickel-copperclad steels.
	E NiCu-7	> 300	> 480	
	EN ISO 14172	Elongation A	Impact strength KV	
	E Ni 4060	> 30	> 80	
UTP 068 HH	AWS 5.11	Yield strength RP0,2	Tensile strength Rm	UTP 068 HH is predominantly used for repair identical or similar heat resistant Ni-base alloys, heat resistant austenites, cold tough Ni-steel, and for joining heat resistant austenitic-ferritic materials.
	E NiCrFe-3 (mod.)	420	680	
	EN ISO 14172	Elongation A	Impact strength KV	
	E Ni 6082	40	120	
UTP 6222 Mo	AWS 5.11	Yield strength RP0,2	Tensile strength Rm	UTP 6222 Mo is particularly suited for joining, repair and surfacing on nickel alloys, austenitic steels, low temperature nickel steels, austenitic-ferritic-joints and claddings.
	E NiCrMo-3	> 450	> 760	
	EN ISO 14172	Elongation A	Impact strength KV	
	E Ni 6625	> 30	> 75	
UTP 7015	AWS 5.11	Yield strength RP0,2	Tensile strength Rm	UTP 7015 is employed for repair and surfacing of nickel-base materials. UTP 7015 is also recommended for welding different materials, such as austenitic to ferritic steels, as well as for weld claddings on unalloyed and low-alloyed steels, e.g. for reactor construction.
	E Ni 6182	400	670	
	EN ISO 14172	Elongation A	Impact strength KV	
	E NiCrFe-3	40	120	

## Cast Iron

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP 8	AWS A5.15	Yield strength RP0,2	Hardness HB	UTP 8 is for cold welding of grey and malleable cast iron, cast steel and for repair these base metals to steel, copper and copper alloys, especially for repair and maintenance.
	E Ni-CI	approx. 220	approx. 180	
	EN ISO 1071			
	E C Ni-CI 1			
UTP 83 FN	AWS A5.15	Hardness HB		UTP 83 FN is suitable for surfacing and repair of all commercial cast iron grades, such as lamellar grey cast iron and nodular cast iron, malleable cast iron and for repair these materials to steel or cast steel.
	E NiFe-CI	approx. 190		
	EN ISO 1071			
	E C NiFe-11			
UTP 86 FN	AWS A5.15	Yield strength RP0,2	Hardness HB	UTP 86 FN is suitable for repair, joining and surfacing of lamellar grey cast iron EN GJL 100 - EN GJL 400, nodular cast iron (spheroidal cast iron) EN GJS 400 - EN GJS 700 and malleable cast iron grades EN GJMB 350 - EN GJMB 650 as well as for joining these materials with each other or with steel and cast steel.
	E NiFe-CI	approx. 340	approx. 220	
	EN ISO 1071			
	E C NIFE-13			

## Copper alloys

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP 32	AWS A5.6	Yield strength RP0,2	Tensile strength Rm	UTP 32 is a basic-coated tin-bronze stick electrode for repair and surfacing on copper tin alloys with 6 – 8 % Sn, copper-tin alloys and for weld claddings on cast iron materials and on steel.
	E CuSn-C (mod.)	approx. 300	> 30	
	DIN 1733	Elongation A	Hardness HD	
	EL-CuSn7	approx. 7	approx. 100	
UTP 387	AWS A5.6	Yield strength RP0,2	Tensile strength Rm	The copper-nickel base stick electrode UTP 387 is used for repair and surfacing alloys of similar compositions with up to 30 % nickel, as well as non-ferrous alloys and steels of different nature.
	E CuNi	> 240	> 390	
	DIN 1733	Elongation A	Impact strength KV	
	EL-CuNi30Mn	> 30	> 80	

# Surfacing electrodes for anti-wear and anti-corrosion



Product Name	Abrasion	Corrosion	Erosion	Cavitation	Heat	Impact	Metal to Earth	Metal to Metal
UTP 34 N		•		•				•
UTP 73 G 2	•		•		•	•		•
UTP 73 G 3	•		•		•	•		•
UTP 73 G 4	•		•		•	•		•
UTP 673	•		•		•	•		•
UTP 690					•			•
UTP 750		•			•	•		•
UTP 7200						•		•
UTP BMC						•		•
UTP CELSIT 706	•	•	•	•	•	•		•
UTP CELSIT 721	•	•	•	•	•	•		•
UTP DUR 250								•
UTP DUR 350						•		•
UTP DUR 600	•		•			•	•	•
UTP LEDURIT 61	•		•				•	
UTP LEDURIT 65	•		•		•		•	

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP 34 N	AWS A5.13	Yield strength R <sub>P0,2</sub>	Tensile strength R <sub>m</sub>	UTP 34 N is suitable for repair and surfacings on copper-aluminium alloys, specially with high Mn-content as well as for claddings on cast iron materials and steel.
	E CuMnNiAl	400	650	
	EN 14700	Elongation A	Hardness HB	
	E Cu1	15	220	
UTP 73 G 2	DIN 8555	Hardness HRC		UTP 73 G 2 is, due to its high hardness, toughness and heat resistance ideally suited for buildups on parts subject to severe friction, compression and moderate impact loads at elevated temperatures.
	E 3-UM-55-ST	55 - 58		
	EN 14700			
	E Fe8			
UTP 73 G 3	DIN 8555	Hardness HRC		UTP 73 G 3 is, due to its high strength, toughness and heat resistance ideally suited for buildups on parts subject to friction, compression and impact at elevated temperatures.
	E 3-UM-45-T	approx. 45-50		
	EN 14700			
	E Fe3			
UTP 73 G 4	DIN 8555	Hardness HRC		UTP 73 G 4 is, due to its toughness and heat resistance, ideally suited for surfacings on parts and tools subject to abrasion, compression and impact at elevated temperatures.
	E 3-UM-40-PT	approx. 38 - 42		
	EN 14700			
	E Z Fe3			
UTP 673	DIN 8555	Hardness HRC	Heat resistant	UTP 673 is used for wear resistant buildups on cold and hot working tools, particularly for cutting-edges on hot cutting tools, hot-shear blades, trimming tools and cold cutting knives.
	E 3-UM-40-PT	approx. 58	up to 550° C	
	EN 14700			
	E Z Fe3			

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP 690	AWS A5.13	Hardness HRC		UTP 690 is used for repair and production of cutting tools, particularly for building-up cutting edges and working surfaces. (soft annealed 800-840°C approx. 25 HRC)
	E Fe 5-B (mod.)	approx. 62		
	EN 14700			
	E Fe4			
UTP 750	DIN 8555	Hardness HRC		UTP 750 is suited for heat resistant buildups on hot working steels particularly exposed to metallic gliding wear and elevated thermal shock stress. (soft annealed 850 – 900 °C approx. 35 HRC)
	E 3-UM-50-CTZ	48 - 52		
	EN 14700			
	E Z Fe6			
UTP 7200	AWS A5.13	Hardness HB	Hardness HRC	UTP 7200 is predominantly suited for tough and crack resistant joinings, repairs and surfacings on parts of high Mn-steel subject to extreme impact, compression and shock.
	~ E FeMn-A	After welding	After workhardening	
	EN 14700	200 - 250	48 - 53	
	EZ Fe9			
UTP BMC	DIN 8555	Hardness HB	Hardness HRC	UTP BMC is suitable for claddings on parts subject to highest pressure and shock in combination with abrasion.
	E 7-UM-250-KPR	After welding	After workhardening	
	EN 14700	approx. 260	48 - 53	
	E Fe9			
UTP CELSIT 706	AWS A5.13	Hardness HRC		UTP CELSIT 706 is used for hardfacing on parts subject to a combination of erosion, corrosion, cavitation, impact, pressure, abrasion and high temperatures up to 900 °C.
	E CoCr-A	40 - 42		
	EN 14700			
	E Z Co2			
UTP CELSIT 721	AWS A5.13	Hardness HRC	Hardness HRC	UTP CELSIT 721 is used for crack resistant hardfacing on parts subject to a combination of impact, pressure, abrasion, corrosion and high temperatures up to 900 °C.
	E CoCr-E	After welding	After workhardening	
	EN 14700	31 - 37	45	
	E Co1			
UTP DUR 250	DIN 8555	Hardness HB		UTP DUR 250 is used for surfacing on parts, where a tough and easily machinable deposit is required.
	E 1-UM-250	approx. 270		
	EN 14700			
	E Fe1			
UTP DUR 350	DIN 8555	Hardness HB		UTP DUR 350 is particularly suited for wear resistant surfacings on Mn-Cr-V alloyed parts.
	E 1-UM-350	approx. 370		
	EN 14700			
	E Fe1			
UTP DUR 600	DIN 8555	Hardness HRC		UTP DUR 600 is universally applicable for cladding on parts of steel, cast steel and high Mn-steel, subject simultaneously to abrasion, impact and compression.
	E 6-UM-60	56 - 58		
	EN 14700			
	E Fe8			
UTP LEDURIT 61	AWS A5.13	Hardness HRC		UTP LEDURIT 61 is suited for highly wear resistant claddings on parts subject to strong grinding abrasion combined with medium impact.
	~ E FeCr-A 1	approx. 60		
	EN 14700			
	EZ FE14			
UTP LEDURIT 65	DIN 8555	Hardness HRC		UTP LEDURIT 65 is suited for highly abrasion resistant claddings on parts subject to extreme sliding mineral abrasion, also at elevated temperatures up to 500 °C.
	E 10-UM-65-GRZ	approx. 65		
	EN 14700			
	E Fe16			



# TIG rods for repair of cracked material

## Unalloyed and low alloy steels

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP A 118	AWS A5.18	Yield strength RP0,2	Tensile strength Rm	GTAW solid rod for the welding repair with argon. Typical fields of use: boiler, tank and pipeline constructions and apparatus engineering.
	ER70S-6	440	560	
	EN ISO 636-A	Elongation A	Impact strength KV	
	W 42 5 W3Si1	25	130	
UTP A 641	AWS A5.28	Yield strength RP0,2	Tensile strength Rm	Welding rod for the welding repair with argon. Suitable for repair creep resistant steels in boiler, tank, pipeline and nuclear reactor construction.
	ER80S-G	450	560	
	EN ISO 21952-A	Elongation A	Impact strength KV	
	W CrMo1Si	22	90	

## Stainless Steels

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP A 63	AWS A5.9	Yield strength RP0,2	Tensile strength Rm	UTP A 63 is suitable for particularly crack resistant joining, repair and surfacing of high-strength ferritic and austenitic steels, hard manganese steels and cold-tough steels, as cushioning layer under hard alloys, dissimilar metal joints.
	ER 307 (mod.)	>370	>600	
	EN ISO 14343-A	Elongation A		
	W 18 8 Mn	>30		
UTP A 68 LC	AWS A5.9	Yield strength RP0,2	Tensile strength Rm	UTP A 68 LC is suitable for repair and surfacing in chem. apparatus and vessel construction for working temperatures of - 196 °C up to 350 °C.
	ER 308 L (Si)	400	600	
	EN ISO 14343-A	Elongation A	Impact strength KV	
	W 19 9 L (Si)	35	100	
UTP A 68 Mo	AWS A5.9	Yield strength RP0,2	Tensile strength Rm	UTP A 68 Mo is applicable for repair and surfacings of stabilized, corrosion resistant CrNiMo steels of similar nature in the construction of chemical apparatus and vessels up to working temperatures of 120 °C up to 400 °C.
	ER 318 (Si)	460	680	
	EN ISO 14343-A	Elongation A	Impact strength KV	
	W 19 12 3 NB (Si)	35	100	
UTP A 68 MoLC	AWS A5.9	Yield strength RP0,2	Tensile strength Rm	UTP A 68 MoLC is used for repair and surfacing of low-carbon, corrosion resistant CrNiMo steels exposed to high corrosion for working temperatures up to + 350 °C.
	ER 316 L (Si)	420	600	
	EN ISO 14343-A	Elongation A	Impact strength KV	
	W 19 12 3 L (Si)	35	100	
UTP A 651	AWS A5.9	Yield strength RP0,2	Tensile strength Rm	UTP A 651 is suitable for joining, repair and surfacing of steels of difficult weldability, repair of hot and cold working steels, cushioning layers.
	ER 312	650	750	
	EN ISO 14343-A	Elongation A	Impact strength KV	
	W 29 9	25	27	
UTP A 6824 LC	AWS A5.9	Yield strength RP0,2	Tensile strength Rm	UTP A 6824 LC ist used for repair and surfacing in chem. apparatus and vessel construction for working temperatures up to + 300 °C. Weld cladding of non- and low-alloyed base materials. Dissimilar joints.
	ER 309 L (Si)	400	590	
	EN ISO 14343-A	Elongation A	Impact strength KV	
	W 23 12 L (Si)	30	140	

## Nickel Alloys

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP A 80 M	AWS 5.14	Yield strength RP0,2	Tensile strength Rm	UTP A 80 M is suitable for repair and surfacing of nickel-copper alloys and of nickelcopper-clad steels. Particularly suited for the following materials: 2.4360 NiCu30Fe, 2.4375 NiCu30Al.
	ER NiCu-7	>300	>480	
	EN ISO 18274	Elongation A	Impact strength KV	
	S Ni 4060	>30	>80	
UTP A 068 HH	AWS 5.14	Yield strength RP0,2	Tensile strength Rm	UTP A 068 HH is predominantly used for repair identical or similar high heat resistant Ni-base alloys, heat resistant austenites, and for joining heat resistant austenitic-ferritic materials.
	ER NiCr-3	>380	>640	
	EN ISO 18274	Elongation A	Impact strength KV	
	S Ni 6082	>35	>160	
UTP A 6222 Mo	AWS 5.14	Yield strength RP0,2	Tensile strength Rm	UTP A 6222 Mo has a high nickel content and is suitable for repair high-strength and high-corrosion resistant nickel-base alloys.
	ER NiCrMo-3	>460	>740	
	EN ISO 18274	Elongation A	Impact strength KV	
	S Ni 6625	>30	>100	

## Cast Iron

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP A 8051 Ti	EN ISO 1071	Yield strength RP0,2	Tensile strength Rm	UTP A 8051 Ti is particularly suited for welding of ferritic and austenitic nodular cast iron as well as for joining it with unalloyed and high-alloyed steels, copper and nickel alloys. Build-up layers on grey cast iron qualities are also possible.
	S C NiFe-2	>300	>500	
		Elongation A	Hardness HB	
		>25	approx. 200	

## Copper alloys

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP A 34 N	AWS A5.7	Yield strength RP0,2	Tensile strength Rm	UTP A 34 N is applied in TIG repair and surfacing on complex aluminium bronzes mainly on such materials with a high Mn content as well as on steel and cast steel by using a nodular iron rod.
	ER CuMnNiAl	400	650	
	EN ISO 24373	Elongation A	Hardness HB	
	S Cu 6338	15	220	
UTP A 38	AWS A5.7	Yield strength RP0,2	Tensile strength Rm	UTP A 38 is used for oxygen free copper types according to DIN 1787 OF-Cu, SE-Cu, SWCu, SF-Cu. The main applications are in the electrical industry e.g. for conductor rails or other applications where high electricity is required.
	ER Cu	80	200	
	EN ISO 24373	Elongation A	Hardness HB	
	S Cu 1897 (CuAg1)	20	60	
UTP A 381	AWS A5.7	Yield strength RP0,2	Tensile strength Rm	UTP A 381 is used for oxygen free copper types according to DIN 1787 OF-Cu, SE-Cu, SWCu, SF-Cu. The main applicational fields are in the apparatus- and pipeline repair.
	ER Cu	50	200	
	EN ISO 24373	Elongation A	Hardness HB	
	S CU 1898 (CuSn1)	30	approx. 60	
UTP A 387	AWS A5.7	Yield strength RP0,2	Tensile strength Rm	UTP A 387 is used for copper nickel alloys with up to 30 % nickel according to DIN 17664, such as CuNi20Fe (2.0878), CuNi30Fe (2.0882). Chemical industry, seawater desalination plants, ship building, offshore technique.
	ER CuNi	>200	>360	
	EN ISO 24373	Elongation A	Hardness HB	
	S Cu 7158	>30	120	

# Solid wires for repair of cracked material

## Unalloyed and low alloy steels

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP A 118	AWS A5.18	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	GTAW solid wire for the welding repair with argon. Typical fields of use: boiler, tank and pipeline constructions and apparatus engineering.
	ER70S-6	440	560	
	EN ISO 636-A	Elongation A	Impact strength KV	
	G 42 2 C1 3Si1 / G 46 4 M21 3Si1	25	130	
UTP A 119	AWS A5.28	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	Welding rod for the welding repair with argon. Suitable for repair creep resistant steels in boiler, tank, pipeline and nuclear reactor construction.
	ER80S-G	450	560	
	EN ISO 21952-A	Elongation A	Impact strength KV	
	G 46 2 C1 4Si1 / G 46 4 M21 4Si1	22	90	
UTP A 641	AWS A5.28	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	Welding rod for the welding repair with argon. Suitable for repair creep resistant steels in boiler, tank, pipeline and nuclear reactor construction.
	ER80S-G	450	560	
	EN ISO 21952-A	Elongation A	Impact strength KV	
	G CrMo1Si	22	90	

## Stainless Steels

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP A 63	AWS A5.9	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	UTP A 63 is suitable for particularly crack resistant joining, repair and surfacing of high-strength ferritic and austenitic steels, hard manganese steels and cold-tough steels, as cushioning layer under hard alloys, dissimilar metal joints.
	ER 307 (mod.)	>370	>600	
	EN ISO 14343-A	Elongation A		
	G 18 8 Mn	>30		
UTP A 68 LC	AWS A5.9	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	UTP A 68 LC is suitable for repair and surfacing in chem. apparatus and vessel construction for working temperatures of – 196 °C up to 350 °C.
	ER 308 L (Si)	400	600	
	EN ISO 14343-A	Elongation A	Impact strength KV	
	G 19 9 L (Si)	35	100	
UTP A 68 Mo	AWS A5.9	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	UTP A 68 Mo is applicable for repair and surfacings of stabilized, corrosion resistant CrNiMo steels of similar nature in the construction of chemical apparatus and vessels up to working temperatures of 120 °C up to 400 °C.
	ER 318 (Si)	460	680	
	EN ISO 14343-A	Elongation A	Impact strength KV	
	G 19 12 3 Nb (Si)	35	100	
UTP A 68 MoLC	AWS A5.9	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	UTP A 68 MoLC is used for repair and surfacing of low-carbon, corrosion resistant CrNiMo steels exposed to high corrosion for working temperatures up to + 350 °C.
	ER 316 L (Si)	420	600	
	EN ISO 14343-A	Elongation A	Impact strength KV	
	G 19 12 3 L (Si)	35	100	
UTP A 651	AWS A5.9	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	UTP A 651 is suitable for joining, repair and surfacing of steels of difficult weldability, repair of hot and cold working steels, cushioning layers.
	ER 312	650	750	
	EN ISO 14343-A	Elongation A	Impact strength KV	
	G 29 9	25	27	
UTP A 6824 LC	AWS A5.9	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	UTP A 6824 LC ist used for repair and surfacing in chem. apparatus and vessel construction for working temperatures up to + 300 °C. Weld cladding of non- and low-alloyed base materials. Dissimilar joints.
	ER 309 L (Si)	400	590	
	EN ISO 14343-A	Elongation A	Impact strength KV	
	G23 12 L (Si)	30	140	



## Nickel Alloys

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP A 80 M	AWS 5.14	Yield strength RP0,2	Tensile strength Rm	UTP A 80 M is suitable for repair and surfacing of nickel-copper alloys and of nickelcopper-clad steels. Particularly suited for the following materials: 2.4360 NiCu30Fe, 2.4375 NiCu30Al.
	ER NiCu-7	>300	>480	
	EN ISO 18274	Elongation A	Impact strength KV	
	S Ni 4060	>30	>80	
UTP A 068 HH	AWS 5.14	Yield strength RP0,2	Tensile strength Rm	UTP A 068 HH is predominantly used for repair identical or similar high heat resistant Ni-base alloys, heat resistant austenites, and for joining heat resistant austenitic-ferritic materials.
	ER NiCr-3	>380	>640	
	EN ISO 18274	Elongation A	Impact strength KV	
	S Ni 6082	>35	>160	
UTP A 6222 Mo	AWS 5.14	Yield strength RP0,2	Tensile strength Rm	UTP A 6222 Mo has a high nickel content and is suitable for repair high-strength and high-corrosion resistant nickel-base alloys.
	ER NiCrMo-3	>460	>740	
	EN ISO 18274	Elongation A	Impact strength KV	
	S Ni 6625	>30	>100	

## Cast Iron

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP A 8051 Ti	EN ISO 1071	Yield strength RP0,2	Tensile strength Rm	UTP A 8051 Ti is particularly suited for welding of ferritic and austenitic nodular cast iron as well as for joining it with unalloyed and high-alloyed steels, copper and nickel alloys. Build-up layers on grey cast iron qualities are also possible.
	S C NiFe-2	>300	>500	
		Elongation A	Hardness HB	
		>25	approx. 200	

## Copper alloys

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP A 34 N	AWS A5.7	Yield strength RP0,2	Tensile strength Rm	UTP A 34 N is applied in TIG repair and surfacing on complex aluminium bronzes mainly on such materials with a high Mn content as well as on steel and cast steel by using a nodular iron rod.
	ER CuMnNiAl	400	650	
	EN ISO 24373	Elongation A	Hardness HB	
	S Cu 6338	15	220	
UTP A 38	AWS A5.7	Yield strength RP0,2	Tensile strength Rm	UTP A 38 is used for oxygen free copper types according to DIN 1787 OF-Cu, SE-Cu, SWCu, SF-Cu. The main applications are in the electrical industry e.g. for conductor rails or other applications where high electricity is required.
	ER Cu	80	200	
	EN ISO 24373	Elongation A	Hardness HB	
	S Cu 1897 (CuAg1)	20	60	
UTP A 381	AWS A5.7	Yield strength RP0,2	Tensile strength Rm	UTP A 381 is used for oxygen free copper types according to DIN 1787 OF-Cu, SE-Cu, SWCu, SF-Cu. The main applicational fields are in the apparatus- and pipeline repair.
	ER Cu	50	200	
	EN ISO 24373	Elongation A	Hardness HB	
	S Cu 1898 (CuSn1)	30	approx. 60	
UTP A 387	AWS A5.7	Yield strength RP0,2	Tensile strength Rm	UTP A 387 is used for copper nickel alloys with up to 30 % nickel according to DIN 17664, such as CuNi20Fe (2.0878), CuNi30Fe (2.0882). Chemical industry, seawater desalination plants, ship building, offshore technique.
	ER CuNi	>200	>360	
	EN ISO 24373	Elongation A	Hardness HB	
	S Cu 7158	>30	120	

# Surfacing solid wires for anti-wear and anti-corrosion

Product Name	Abrasion	Corrosion	Erosion	Cavitation	Heat	Impact	Metal to Earth	Metal to Metal
UTP A 34 N		•		•				•
UTP A 73 G 2	•		•		•	•		•
UTP A 73 G 3	•		•		•	•		•
UTP A 73 G 4	•		•		•	•		•
UTP A DUR 250								•
UTP A DUR 350						•		•
UTP A DUR 600	•		•			•	•	•
UTP A DUR 650	•		•		•	•	•	•



Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP A 34 N	AWS A5.7	Yield strength RP0,2	Tensile strength Rm	UTP A 34 N is applied for repair and surfacing on complex aluminium bronzes mainly on such materials with a high Mn content as well as on steel and cast steel by using a nodular iron rod.
	ER CuMnNiAl	400	650	
	EN ISO 24373	Elongation A	Hardness HB	
	S Cu 6338	15	220	
UTP A 73 G 2	DIN 8555	Hardness HRC		UTP A 73 G 2 is used for highly wear resistant buildups on machine parts and tools, subject to heavy abrasion and compression combined with moderate impact at elevated temperatures.
	MSG 3-GZ-55-ST	55 - 58		
	EN 14700			
	S Fe8			
UTP A 73 G 3	DIN 8555	Hardness HRC		UTP A 73 G 3 is, due to the excellent hot wear resistance and toughness, used for highly stressed hot working tools, which are simultaneously subject to high mechanical, thermal and abrasive loads.
	MSG 3-GZ-45-T	approx. 45 - 50		
	EN 14700			
	S Z Fe3			
UTP A 73 G 4	DIN 8555	Hardness HRC		UTP A 73 G 4 is, due to its excellent hot wear resistance and toughness, used for buildups on hot working tools and structural parts subject to impact, compression and abrasion at elevated temperatures.
	MSG 3-GZ-40-T	approx. 38 - 42		
	EN 14700			
	S Z Fe3			
UTP A DUR 250	DIN 8555	Hardness HB		UTP A DUR 250 is used for MAG buildups on structural parts subject to rolling wear and where a good machinability is required.
	MSG 1-GZ-250	approx. 250		
	EN 14700			
	SZ Fe 1			
UTP A DUR 350	DIN 8555	Hardness HB		UTP A DUR 350 is suited for MAG buildups on structural parts subject to compression, impact and abrasion, such as caterpillar track components, machine and gear parts, stamps.
	MSG 2-GZ-400	approx. 450		
	EN 14700			
	SZ Fe 2			
UTP A DUR 600	DIN 8555	Hardness HRC		UTP A DUR 600 is universally applicable for MAG buildups on structural parts subject to high impact and medium abrasion.
	MSG 6-GZ-60-S	54 - 60		
	EN 14700			
	S Fe 8			
UTP A DUR 650	DIN 8555	Hardness HRC		UTP A DUR 650 is universally used for MAG buildups on structural parts subject to high impact and abrasion.
	MSG 3-GZ-60	55 - 60		
	EN 14700			
	S Fe 8			

# Flux cored wires for repair of cracked material

## Unalloyed and low alloy steels

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP AF 152	AWS A5.36	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	Rutile flux cored wire with fast freezing slag. Outstanding repair welding properties in all positions. Excellent mechanical properties and good slag detachability, low spatter losses, smooth, finely rippled seam surface, high x-ray security, notch-free weld toes.
	E71T1-M21A4-CS1-H8 E71T1-C1A2-CS1-H4	500	580	
	EN ISO 17632-A	Elongation A	Impact strength KV	
	T 46 4 P M 1 H10 T 42 2 P C 1 H5	26	180	
UTP AF 155	AWS A5.18	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	UTP AF 155 is a high-efficiency flux cored wire with metal powder filling, for all position repair welding with mixed gas M21 acc. to EN ISO 14175.
	E70C-6MH4	460	560	
	EN ISO 17632-A	Elongation A	Impact strength KV	
	T 46 4 M M 1 H5	22	130	
UTP AF 160	AWS A5.36	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	Rutile flux cored wire with fast freezing slag for welding low-temperature steels. Outstanding welding properties in all positions.
	E81T1-M21A8-Ni1-H4	530	570	
	EN ISO 17632-A	Elongation A	Impact strength KV	
	T 50 6 1Ni P M 1 H5	27	140	

## Stainless Steels

Name	Classification	Mechanical properties of the weld metal		Characteristics and field of use
UTP AF 68 LC	AWS A5.22	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	UTP AF 68 LC is a low carbon, CrNi flux-cored wire with rutile slag used for joint-welding of alloyed CrNi-steels and cast steels.
	E 308 LT-0-1 E 308 LT-0-4	380	560	
	EN ISO 17633-A	Elongation A	Impact strength KV	
	T 19 9 L RM3 T 19 9 L RC3	35	70	
UTP AF 68 MoLC	AWS A5.22	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	UTP AF 68 MoLC is a low carbon, CrNi flux-cored wire with rutile slag for joining and surfacing of CrNisteels and cast steel.
	E 316 LT0-1 E 316 LT0-4	400	560	
	EN ISO 17633-A	Elongation A	Impact strength KV	
	T 19 12 3 L RM3 T 19 12 3 L RC3	35	55	
UTP AF 6824 LC	ASME II C SFA 5.22	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	UTP AF 6824 LC is a low-carbon flux-cored wire with rutile slag used for repair welding of alloyed CrNi steels among each other or with other unalloyed or low alloyed steels / cast steels.
	E 309 LT 0-1 E 309 LT 0-4	400	550	
	EN ISO 17633-A	Elongation A	Impact strength KV	
	T 23 12 L RM3 T 23 12 L RC3	35	60	
UTP AF 6222 MoPW	AWS A5.22	Yield strength RP <sub>0,2</sub>	Tensile strength R <sub>m</sub>	The nickel-base-flux-cored wire (NiCrMo) UTP AF 6222 Mo PW is suitable for repair and surfacing on nickel-base materials of the same nature and on C- and CrNi-steels as well as for cladding on C-steels, furthermore in high temperature applications.
	ENiCrMo3 T1-4	490	750	
	EN ISO 17633-A	Elongation A	Impact strength KV	
	T Ni 6625 PM 2	30	70	



# Gas shielded cored wires for repair, anti-wear and anti-corrosion

Product Name	Low stress abrasion	High stress abrasion	Erosion	Impact	Corrosion	Cavitation	Heat	Metal to metal wear
SK AP-G				•	•			•
SK 250-G				•				•
SK 350-G				•				•
SK 600-G	•			•				•
SK 650-G	•			•				•
SK A45-G		•						•
SK ABRA-MAX O/G		•	•					•
SK D8-G								•
SK D12-G								•
SK D20-G	•							•
SK D35-G					•	•	•	•
SK D250-G				•				•
SK STELKAY 6-G					•	•	•	•
SK STELKAY 21-G				•	•	•	•	•
SK STELKAY 25-G				•	•	•	•	•
SK 900 Ni-G		•			•		•	•
SK FNM-G				•	•			•
SK 356-G	•				•			•
SK 741-G					•			•
SK ANTINIT DUR 500					•	•	•	•



## Manganese steels

Name	Classification	Hardness		Composition (All weld metal)											Characteristics and field of use	
SK AP-G	DIN 8555 MF 7-GF-200 KP ISO 14700 T Fe9	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Austenitic alloy with Chromium designed for rebuilding 14 % Manganese steel parts where parent metal matching colour is a must.
		185		0,9	14,5	0,3	12		0,5							

## Low alloy steels

Name	Classification	Hardness		Composition (All weld metal)											Characteristics and field of use	
SK 250-G	DIN 8555 MF 1-GF-225-GP ISO 14700 TZ Fe1	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Metal-cored wire designed for building-up by welding in horizontal and vertical-up positions under gas shielding.
		225		0,09	1,2	0,5	0,4									
SK 350-G	DIN 8555 MF 1-GF-350-GP ISO 14700 T Z Fe1	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Rebuilding and hardfacing alloy for carbon steel parts.
		330		0,35	1,5	0,4	1,4									
SK 600-G	DIN 8555 MF 6-GF-60-GP ISO 14700 T Fe8	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Martensitic steel alloy designed for welding in horizontal and vertical-up positions under gas shielding. Its resistance to friction and low stress abrasive wear with moderate impact is excellent.
			59	0,52	1,5	1,2	5,9		0,8		0,05					
SK 650-G	DIN 8555 MF 3-GF-60-GT ISO 14700 T Fe8	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Martensitic steel alloy designed for welding in horizontal and vertical-up positions under gas shielding. Its resistance to friction and medium stress abrasive wear with moderate impact is excellent.
			58	0,45	0,9	0,6	5,5		1,4			1,6	0,5			

## High alloyed steels

Name	Classification	Hardness		Composition (All weld metal)											Characteristics and field of use	
SK A45-G	DIN 8555 MF 10-GF-65-GT ISO 14700 T Fe16	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Chromium-Niobium-Molybdenum alloy with addition of Tungsten and Vanadium designed to resist high stress grinding abrasion with low impact and solid erosion at service temperatures up to 650 °C.
			63	5,3	0,1	0,7	21		6,3	6		1,8	0,75			
SK ABRA-MAX O/G	DIN 8555 MF 6-GF-70-GT ISO 14700	HB	HRC	C + Cr + Mo + Nb + W + V + B (Bal Fe)											Special hardfacing cored wire designed to give an extreme resistance against high stress grinding abrasion and erosion without impact.	
			69 -70													

## Tool steels

Name	Classification	Hardness		Composition (All weld metal)											Characteristics and field of use	
SK D8-G	DIN 8555 MF 3-GF-40-T ISO 14700 T Z Fe3	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Special alloy designed for the repair and the hard surfacing of tools working at low and high temperatures.
			38	0,1	1,1	0,4	2,4					3,8	0,6			
SK D12-G	DIN 8555 MF 3-GF-55-T EN ISO 14700 T Z Fe3	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Metal cored wire designed for hardsurfacing of tool steel parts.
			55	0,35	1,2	0,3	7,5		1,7		0,3					
SK D20-G	DIN 8555 MF 4-GF-60-S EN ISO 14700 T Z Fe8	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Special alloy designed to deposit a molybdenum-alloyed high-speed steel. To avoid cracking, a minimum interpass temperature of 300 °C should be applied.
			60	1,2	0,4	0,4	4,5		8			1,8	1,7			
SK D35-G	DIN 8555 MF 6-GF-50-CT EN ISO 14700 T Z Fe3	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Co	Ti	W	V	B	Fe	Special Iron-Chromium-Cobalt-Molybdenum alloy designed to resist metal-to-metal wear, fatigue, oxidation, cavitation and corrosion at high temperature. The typical hardness can be achieved in the first layer.
			50	0,16	0,1	0,7	13		2,4	14						
SK D250-G	DIN 8555 MF 1-GF-350 EN ISO 14700	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Special alloy suitable for repair of tool steel parts working at high temperatures. The deposit is particularly resistant against cracks propagation.
			330	0,09	0,8	0,3	2,9	2,4								

## Cobalt steels

Name	Classification	Hardness		Composition (All weld metal)													Characteristics and field of use
		HB	HRC	C	Mn	Si	Cr	Co	Mo	Nb	Ti	W	V	B	Fe		
SK STELKAY 6-G	DIN 8555 MF 20-GF-40-CTZ ASME IIC SFA 5.21 ERC CoCr-A ISO 14700 T Co2	HB	HRC	C	Mn	Si	Cr	Co	Mo	Nb	Ti	W	V	B	Fe	Cobalt base alloy providing excellent resistance to metal-to-metal wear, oxidation, thermal cycling and impact in corrosive environments at high temperature.	
			40	0,95	0,8	1,4	30	Bal.				4,2					3
SK STELKAY 21-G	DIN 8555 MF 20-GF-300-CTZ ASME IIC SFA 5.21 ERC CoCr-E ISO 14700 T Co1	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Co	Ti	W	V	B	Fe	Cobalt base alloy providing excellent resistance to metal-to-metal wear, thermal shocks, oxidation in corrosive environments at high temperature.	
			32	0,27	1	1,2	28	2,4	5	Bal.							3,5
SK STELKAY 25-G	DIN 8555 MF 20-GF-200-STZ ISO 14700 T Co1	HB	HRC	C	Mn	Si	Cr	Ni	Co	Nb	Ti	W	V	B	Fe	Cobalt base alloy providing excellent resistance to metal-to-metal wear, thermal shocks, oxidation in corrosive environments at high temperature.	
			195		0,01	0,8	0,4	20,2	10	Bal.			13				3,5

## Nickel alloys

Name	Classification	Hardness		Composition (All weld metal)													Characteristics and field of use
		HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe		
SK 900 Ni-G	DIN 8555 MF 22-GF-45-G ISO 14700 T Ni20	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Hardfacing cored wire containing about 45 % Tungsten carbide particles incorporated in a NiB matrix.	
			46	1,7	0,1	0,1		Bal.				41,5		0,8	1,1		
SK FNM-G	DIN 8555 MSG23-GF-200 ISO 14700	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	FeNi alloy with 12 % Manganese designed for joining and surfacing of cast iron pieces. Can also be used for dissimilar welding between cast iron and steel.	
			145		0,2	12	0,4		Bal.								48

## Stainless Steel

Name	Classification	Hardness		Composition (All weld metal)													Characteristics and field of use
		HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe		
SK 356-G	DIN 8555 MF 4-GF-50-ST ISO 14700 T Fe8	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Special iron base alloy designed to rebuild parts in the rubber industry.	
			47	0,7	1,2	0,9	12	0,7	3,8			0,9	2		Bal.		
SK 741-G	DIN 8555 MF 5-GF-40-C ISO 14700 T Fe7	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Alloy depositing a ferritic-martensitic steel containing 13 % Chromium, 5 % Nickel and 1 % Molybdenum designed to resist metal-to-metal wear, corrosion and thermal fatigue fire cracking.	
			41	0,06	0,5	0,6	13	5,5	0,8						Bal.		
SK ANTINIT DUR 500	DIN 8555 MF 9-GF-45-CT ISO 14700 T Fe10	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	For Hardfacing of or austenitic steels exposed to general corrosion, frictional wear, cavitation , or to high surface pressure. For use at temperatures up to 550 °C. Offers additionally enhanced resistance to pitting and intergranular corrosion. Preheating to 450 - 500 °C.	
			43	0,07	4,3	4,5	17,5	8	5,4	1							



# Open arc cored wires for repair, anti-wear and anti-corrosion

Product Name	Low stress abrasion	High stress abrasion	Erosion	Impact	Corrosion	Cavitation	Heat	Metal to metal wear
SK 218-O				•				
SK 624-O		•		•				
SK AP-O				•	•			
SK 258-O	•			•				
SK 258 TIC-O		•		•				
SK 400-O				•				•
SK 162-O		•	•					
SK 255-O		•	•					
SK 256-O		•	•					
SK 866-O		•	•					
SK 867-O		•	•					
SK 900-O		•	•					
SK A43-O		•	•					
SK A45-O		•	•					
SK 370-O					•		•	•
SK 402-O			•		•			•
SK 714 N-O					•			•





## Manganese steels

Name	Classification	Hardness		Composition (All weld metal)											Characteristics and field of use	
		HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B		Fe
SK 218-O	DIN 8555 MF 7-GF-200-KP ASME IIC SFA 5.21 ERC FeMn-G EN 14700 T Z Fe9	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Self shielded flux cored wire depositing an austenitic alloy designed for rebuilding of 14 % Manganese steel parts.
		200		0,9	14	0,5	3,5	0,4								
SK 624-O	DIN 8555 MF 7-GF-250-GKP EN 14700 T Fe9	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	High Manganese-Chromium alloy enriched with Niobium, designed to resist abrasion and solid erosion wear combined with heavy impact. High Manganese alloy resulting in a workhardenable deposit.
		240		1	17,2	0,3	8,2			2,5	0,12					
SK AP-O	DIN 8555 MF 7-GF-200-KP ASME IIC SFA 5.21 FeMn-Cr EN 14700 T Z Fe9	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Multi-purpose cored wire, mainly used for rebuilding and joining of Carbon and 14 % Manganese steels. Can also be used as buffer layer prior to hard overlay. Work-hardenable alloy.
		205		0,37	16	0,3	12,8									



## Low alloy steels

Name	Classification	Hardness		Composition (All weld metal)											Characteristics and field of use	
		HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B		Fe
SK 258-O	DIN 8555 MF 6-GF-55-GT EN 14700 T Fe8	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Martensitic alloy designed to give an outstanding resistance to low stress abrasion with heavy impact and high compressive stresses. The deposit is heat treatable and forgeable.
		55		0,47	1,5	0,8	5,7		1,4			1,5				
SK 258 TIC-O	DIN 8555 MF 6-GF-60-GP EN 14700 T Z Fe8	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Martensitic Chromium-Titanium alloy designed to resist high stress abrasion with heavy impact. Deposits usually do not show stress relief cracks.
		58		1,8	0,9	0,2	6,1		1,4		5,5					
SK 400-O	DIN 8555 MF 1-GF-40-P EN 14700 T Z Fe1	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Open-arc wire designed for rebuilding and hardfacing of Carbon steel parts subjected to adhesive wear with impacts.
		40		0,13	0,7	0,6	2,4									



## High alloyed steels

Name	Classification	Hardness		Composition (All weld metal)											Characteristics and field of use	
		HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B		Fe
SK 162-O	DIN 8555 MF 10-GF-65-G EN 14700 T Fe15	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	High Chromium alloy designed to resist high stress grinding abrasion with low impact. The deposit will show readily stress relief cracks.
			63	5,4	0,2	1,3	27									
SK 255-O	DIN 8555 MF 10-GF-60-G ASME IIC SFA 5.21 FeCr-A9 EN 14700 T Z Fe14	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Open-arc metal cored wire designed to deposit a metal resistant to high stress grinding abrasion with low impact. The deposits will readily show stress relief cracks.
			60	5	0,6	1	27							0,5	Bal.	
SK 256-O	DIN 8555 MF 10-GF-65-G EN 14700 T Fe16	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	High Chromium carbide alloy designed to resist high stress grinding abrasion with low impact. The deposits will readily show stress relief cracks.
			63	5,5	1,1	1,2	25,7								Bal.	
SK 866-O	DIN 8555 MF 10-GF-60-G EN 14700 T Z Fe15	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Alloy designed to resist high stress grinding abrasion with low impact. The deposits will readily show stress relief cracks.
			60	4,5	0,7	0,8	27							0,5	Bal.	
SK 867-O	DIN 8555 MF 10-GF-60-G EN 14700 T Fe16	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Alloy designed to resist high stress grinding abrasion with low impact. The deposits will readily show stress relief cracks.
			60	4,5	0,7	0,8	27							0,5	Bal.	
SK 900-O	DIN 8555 MF 21-GF-65-G EN 14700 T Fe20	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Cored wire containing about 60 % Tungsten carbide particles. The composition and particle size have been optimized to provide the best combination of toughness and wear resistance.
			63	2,9	0,4	0,4	5,8					42			Bal.	
SK A43-O	DIN 8555 MF 10-GF-65-G EN 14700 T Z Fe15	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	CrNb alloy designed to resist high stress grinding abrasion at service temperature not exceeding 450 °C. The deposit will readily show stress relief cracks.
			64	5,6	0,2	1,3	20,2			6,7					Bal.	
SK A45-O	DIN 8555 MF 10-GF-65-GT EN 14700 T Z Fe16	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Chromium-Niobium-Molybdenum alloy with addition of Tungsten and Vanadium designed to resist high stress grinding abrasion with low impact and solid erosion at service temperatures up to 650 °C.
			63	5,3	0,2	0,7	27,2		6,3	6,1		1,9	1		Bal.	

## Stainless Steel

Name	Classification	Hardness		Composition (All weld metal)											Characteristics and field of use	
		HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B		Fe
SK 370-O	DIN 8555 MF 5-GF-400-C EN 14700 T Fe7	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Self shielded cored wire depositing a ferritic-martensitic steel designed to resist metal-to-metal wear, corrosion and thermal fatigue fire cracking.
			42	0,03	0,5	0,6	15,5	5,2	0,5						Bal.	
SK 402-O	DIN 8555 MF 8-GF-150/400-KPZ EN 14700 T Z Fe10	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Austenitic alloy type 18Cr8Ni7Mn recommended for build up and buffer layer prior to hardfacing. It can also be used for joining of dissimilar metals.
			160		0,09	6	0,9	18	7,8						Bal.	
SK 714 N-O	DIN 8555 MF 5-GF-45 EN 14700 T Fe7	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	N	W	V	B	Fe	Alloy depositing a ferritic-martensitic steel with addition of nitrogen designed to resist metal-to-metal wear, corrosion and thermal fatigue.
			44	0,03	1	0,6	13	4,2	0,5		0,1				Bal.	

# Submerged arc cored wires for anti-wear and anti-corrosion

## Construction and low alloyed steel

Name	Classification	Hardness		Composition (All weld metal)													Characteristics and field of use
		HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe		
SK BU-S	DIN 8555 UP 1-GF-300-P ISO 14700 T Fe6	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Rebuilding alloy for Carbon steel parts.	
		275		0,12	1,2	0,6	0,7		0,4								Bal.
SK CrMo15-SA	DIN 8555 UP 1-GF-250 ISO 14700 T Fe1	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Rebuilding alloy (1% Cr . 0.5% Mo) for not or slightly alloyed steels.	
		230		0,03	0,8	0,6	1,15		0,5								Bal.

## Stainless steels

Name	Classification	Hardness		Composition (All weld metal)													Characteristics and field of use
		HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe		
SK 385-SA	DIN 8555 UP 6-GF-55-CG ISO 14700 T Fe8	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Martensitic alloy giving a very good resistance to metal-to-metal wear, corrosion and thermal fatigue.	
			54	0,3	1,3	0,4	16		0,5								Bal.
SK 410 NiMo-SA	DIN 8555 UP 5-GF-40-C ISO 14700 T Fe7	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Alloy depositing a ferritic-martensitic steel containing 13% Chromium, 5% Nickel and 1% Molybdenum designed to resist metal-to-metal wear, corrosion and thermal fatigue fire cracking.	
			39	0,04	1	0,3	12	5	0,9								Bal.
SK 415-SA	DIN 8555 UP 5-GF-45-C ISO 14700 T Fe7	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Alloy depositing a ferritic-martensitic steel designed to resist metal-to-metal wear, corrosion and thermal fatigue.	
			42	0,8	0,9	0,4	13,5	2,1	1,1	0,2			0,3				Bal.
SK 420-SA	DIN 8555 UP 6-GF-55-C ISO 14700	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Alloy depositing a martensitic steel containing 13% Chromium giving a good resistance to metal-to-metal wear and corrosion.	
			53	0,27	1,4	0,4	13,5										Bal.
SK 430C-SA	DIN 8555 UP 5-GF-200-C ISO 14700	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Alloy depositing a ferritic steel containing 17% Chromium giving a good resistance to corrosion and also used as a buffer layer for Surfacing of CC Rollers.	
			175	0,04	0,9	0,5	19,5										Bal.
SK 430 NiMo-SA	DIN 8555 UP 5-GF-300-C ISO 14700 T Fe7	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	B	Fe	Flux cored wire for submerged arc welding specially designed to deposit an alloy of the 410 NiMo-type directly on the first layer.	
			220	0,05	0,9	0,7	17	5,6	1,3								Bal.
SK 461C-SA	DIN 8555 UP 6-GF-50-C ISO 14700 T Fe8	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	Co	Fe	Alloy depositing a ferritic-martensitic steel designed to resist metal-to-metal wear, corrosion and thermal fatigue fire cracking.	
			54	0,26	0,9	0,5	12,2	0,4	1,4			0,9	1	1,8			Bal.
SK 742N-SK	DIN 8555 UP 5-GF-45-C ISO 14700 T Fe7	HB	HRC	C	Mn	Si	Cr	Ni	Mo	Nb	Ti	W	V	N	Fe	Alloy depositing a ferritic-martensitic steel with addition of Nitrogen designed to enhance the resistance to thermal fatigue and intergranular corrosion by reducing the formation of carbides at grain boundaries.	
			44	0,05	1,2	0,4	13,5	3,3	1,3	0,1				0,1			Bal.

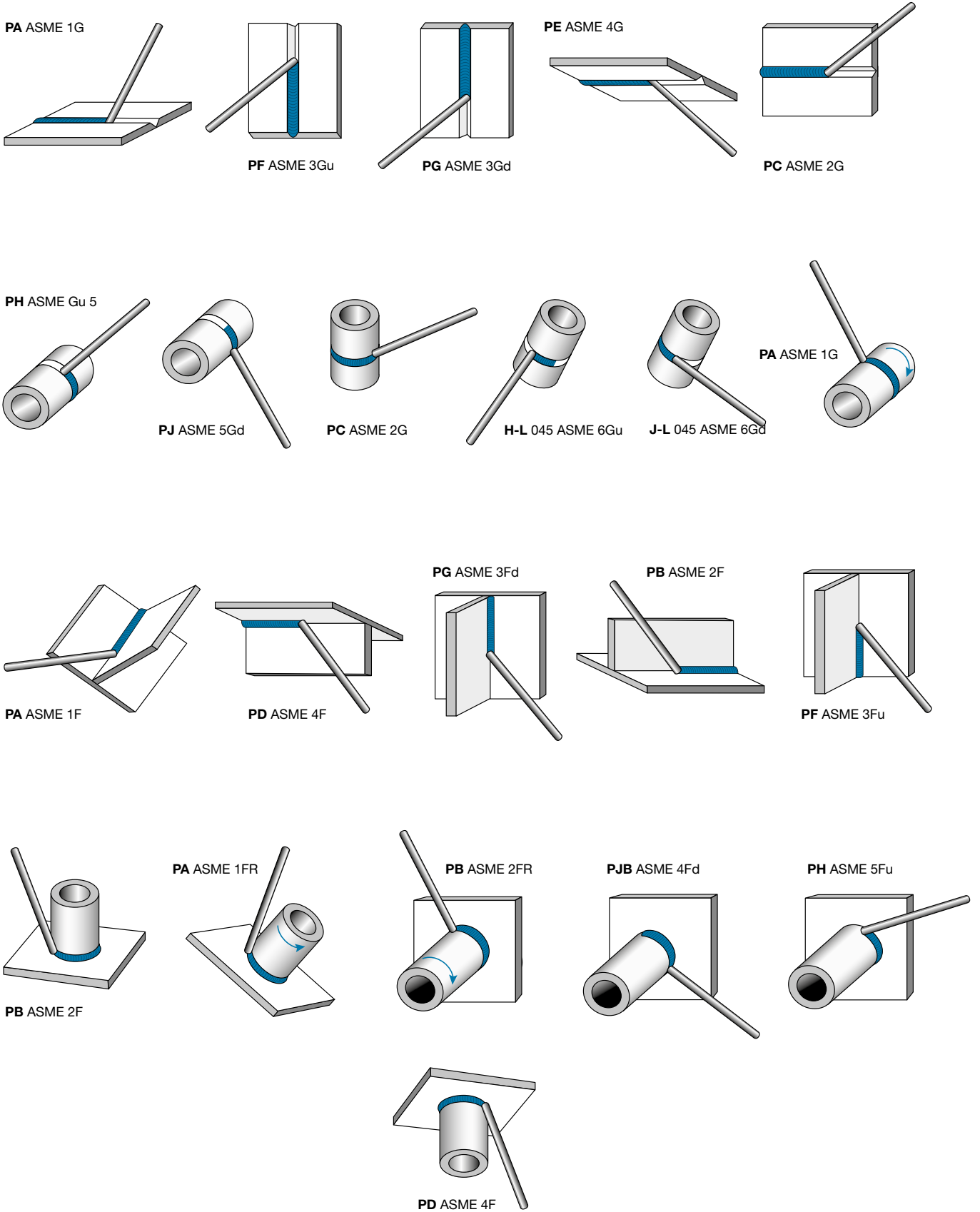
## Hardness conversion table

R <sub>m</sub>	HV	HB	HRC	R <sub>m</sub>	HV	HB	HRC	R <sub>m</sub>	HV	HB	HRC	R <sub>m</sub>	HV	HB	HRC	R <sub>m</sub>	HV	HB	HRC				
200	63	60	-	545	170	162	-	890	278	264	-	510	160	152	-	860	268	255	25	1230	382	363	39
210	65	62	-	550	172	163	-	900	280	266	27	520	163	155	-	865	270	257	-	1240	385	366	-
220	69	66	-	560	175	166	-	910	283	269	-	530	165	157	-	870	272	258	26	1250	388	369	-
225	70	67	-	570	178	169	-	915	285	271	-	540	168	160	-	880	275	261	-	1255	390	371	-
230	72	68	-	575	180	171	-	920	287	273	28	1260	392	372	40	1620	497	-	49	1980	596	-	55
240	75	71	-	580	181	172	-	930	290	276	-	1270	394	374	-	1630	500	-	-	1990	599	-	-
250	79	75	-	590	184	175	-	940	293	278	29	1280	397	377	-	1640	503	-	-	1995	600	-	-
255	80	76	-	595	185	176	-	950	295	280	-	1290	400	380	-	1650	506	-	-	2000	602	-	-
260	82	78	-	600	187	178	-	960	299	284	-	1300	403	383	41	1660	509	-	-	2010	605	-	-
270	85	81	-	610	190	181	-	965	300	285	-	1310	407	387	-	1665	510	-	-	2020	607	-	-
280	88	84	-	620	193	184	-	970	302	287	30	1320	410	390	-	1670	511	-	-	2030	610	-	-
285	90	86	-	625	195	185	-	980	305	290	-	1330	413	393	42	1680	514	-	50	2040	613	-	-
290	91	87	-	630	197	187	-	990	308	293	-	1340	417	396	-	1690	517	-	-	2050	615	-	56
300	94	89	-	640	200	190	-	995	310	295	31	1350	420	399	-	1700	520	-	-	2060	618	-	-
305	95	90	-	650	203	193	-	1000	311	296	-	1360	423	402	43	1710	522	-	-	2070	620	-	-
310	97	92	-	660	205	195	-	1010	314	299	-	1370	426	405	-	1720	525	-	-	2080	623	-	-
320	100	95	-	670	208	198	-	1020	317	301	32	1380	430	409	-	1730	527	-	51	2090	626	-	-
330	103	98	-	675	210	199	-	1030	320	304	-	1390	431	410	-	1740	530	-	-	2100	629	-	-
335	105	100	-	680	212	201	-	1040	323	307	-	1400	434	413	44	1750	533	-	-	2105	630	-	-
340	107	102	-	690	215	204	-	1050	327	311	33	1410	437	415	-	1760	536	-	-	2110	631	-	-
350	110	105	-	700	219	208	-	1060	330	314	-	1420	440	418	-	1770	539	-	-	2120	634	-	-
360	113	107	-	705	220	209	-	1070	333	316	-	1430	443	421	45	1775	540	-	-	2130	636	-	-
370	115	109	-	710	222	211	-	1080	336	319	34	1440	446	424	-	1780	541	-	-	2140	639	-	57
380	119	113	-	720	225	214	-	1090	339	322	-	1450	449	427	-	1790	544	-	52	2145	640	-	-
385	120	114	-	730	228	216	-	1095	340	323	-	1455	450	428	-	1800	547	-	-	2150	641	-	-
390	122	116	-	740	230	219	-	1100	342	325	-	1460	452	429	-	1810	550	-	-	2160	644	-	-
400	125	119	-	750	233	221	-	1110	345	328	35	1470	455	432	-	1820	553	-	-	2170	647	-	-
410	128	122	-	755	235	223	-	1120	349	332	-	1480	458	435	46	1830	556	-	-	2180	650	-	-
415	130	124	-	760	237	225	-	1125	350	333	-	1485	460	437	-	1840	559	-	-	2190	653	-	-
420	132	125	-	770	240	228	-	1130	352	334	-	1490	461	438	-	1845	560	-	53	2200	655	-	58
430	135	128	-	780	243	231	21	1140	355	337	36	1500	464	441	-	1850	561	-	-	-	675	-	59
440	138	131	-	785	245	233	-	1150	358	340	-	1510	467	444	-	1860	564	-	-	-	698	-	60
450	140	133	-	790	247	235	-	1155	360	342	-	1520	470	447	-	1870	567	-	-	-	720	-	61
460	143	136	-	800	250	238	22	1160	361	343	-	1530	473	449	47	1880	570	-	-	-	745	-	62
465	145	138	-	810	253	240	-	1170	364	346	37	1540	476	452	-	1890	572	-	-	-	773	-	63
470	147	140	-	820	255	242	23	1180	367	349	-	1550	479	455	-	1900	575	-	-	-	800	-	64
480	150	143	-	830	258	245	-	1190	370	352	-	1555	480	456	-	1910	578	-	54	-	829	-	65
490	153	145	-	835	260	247	24	1200	373	354	38	1560	481	-	-	1920	580	-	-	-	864	-	66
495	155	147	-	840	262	249	-	1210	376	357	-	1570	484	-	48	1930	583	-	-	-	900	-	67
500	157	149	-	850	265	252	-	1220	380	361	-	1580	486	-	-	1940	586	-	-	-	940	-	68
												1590	489	-	-	1950	589	-	-				
												1595	490	-	-	1955	590	-	-				
												1600	491	-	-	1960	591	-	-				
												1610	494	-	-	1970	594	-	-				

**R<sub>m</sub>** = Tensile strength (MPa)      **HB** = Brinell hardness  
**HV** = Vickers hardness              **HRC** = Rockwell hardness

Caution: Because of their approximate nature, conversion tables must be regarded as only an estimate of comparative values. It is recommended that hardness conversions be applied primarily to values such as specification limits, which are established by agreement or mandate, and that the conversion of test data be avoided whenever possible.

Welding positions according to EN ISO 6947 und ASME code, section IX







# voestalpine Böhler Welding

## Welding know-how joins steel

With over 100 years of experience, voestalpine Böhler Welding is the global top address for the daily challenges in the areas of joint welding, wear and corrosion protection as well as brazing. Customer proximity is guaranteed by more than 40 subsidiaries in 25 countries, with the support of 2,200 employees, and through more than 1,000 distribution partners worldwide. With individual consultation by our application technicians and welding engineers, we make sure that our customers master the most demanding welding challenges. voestalpine Böhler Welding offers three specialized and dedicated brands to cater for our customers' and partners' requirements.



**Lasting Connections** – More than 2,000 products for joint welding in all conventional arc welding processes are united in a product portfolio that is unique throughout the world. Creating Lasting Connections is the brand's philosophy in welding and between people.



**Tailor-Made Protectivity™** – Decades of industry experience and application know-how in the areas of repair of cracked material, anti-wear and cladding, combined with innovative and custom-tailored products, guarantee customers an increase in the productivity and protection of their components.



**In-Depth Know-How** – Through deep insight into processing methods and ways of application, Fontargen Brazing provides the best brazing and soldering solutions based on proven products with German technology. The expertise of this brand's application engineers has been formulated over many years of experience from countless application cases.

