Meltolit

HARDFACING CONSUMABLES

CONTENT

* Information about our thermal spray powders, arc spray wires, PTA powders, laser powders and laser tig wires you will find on our website: www.meltolit.se

THE COMPANY

Meltolit was founded in 1963. From the beginning there were only precious metals in the product range but this gradually included silver brazing alloys and copper brass. Eventually welding was included and we now offer a complete range of consumables for welding, brazing and hardfacing.

Our own Meltolit brand includes high quality products for production, repair and maintenance.
The company strength has always been quality, know how and flexibility.

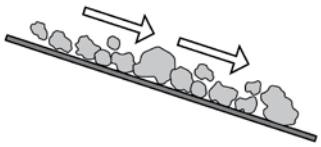
We are situated in Gothenburg, Sweden with both main warehouse and head office from where we serve customers around the globe but with focus on Scandinavia.

HARDFACING OVERVIEW

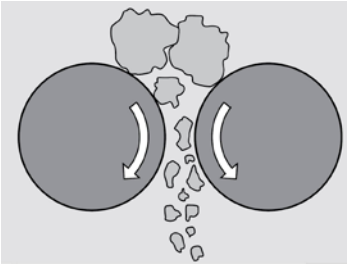
VARIOUS TYPES OF WEAR

Hardfacing is used wherever there is wear. It protects parts and applications that are exposed to various types of wear.
It will not only restore old worn down material but can be used in a preventive way in new production. This can save large costs in production with a lower cost base material and instead hardface the areas exposed to wear. Its important to know that high hardness alone is not something that gives you better wear protection. This is achieved by using the correct hardfacing material for the right application. This catalogue will give you the help you need to choose the correct filler metal for your application.

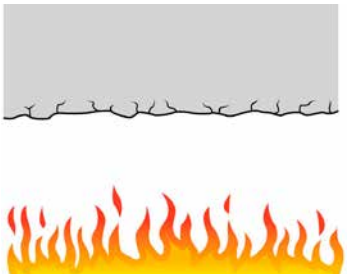
Abrasion from mineral wear
The result of particles sliding against a surface.
Gravel industry, energy plants, mining, agricultural applications etc.



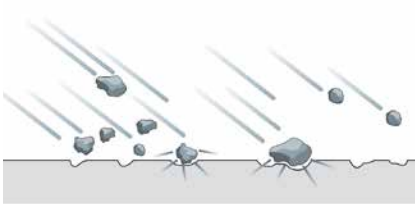
High Abrasion combined with **pressure**
Mineral crushers, mining, scrapers, mixer paddles etc.



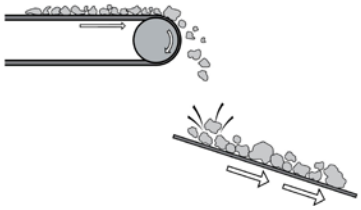
Thermal fatigue cracking
Occurs when a part are repeatedly heated and cooled and thermal expansion reoccurs. Hot forging tools, hot rollers



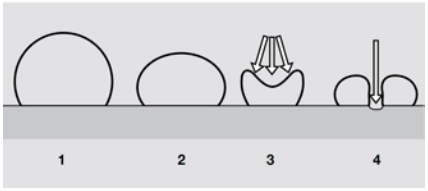
Erosion
Similar to arbasion but occurs when particles or liquid strike the surface in high speed. Dregdging pumps, sludging etc.



Impact combined with **abrasion**
The result of particles hitting a surface or a part hitting other hard objects.
Crushers, excavators, quarries etc

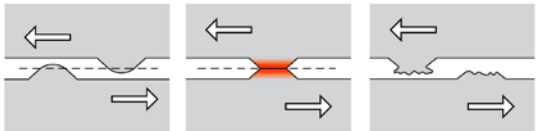


Cavitation
When changes of pressure in liquids lead to base metal fatigue and eventually results in lack of material(cavities). Typical for turbine blades, water turbine components etc.



Corrosion
When talking about corrosion the term "cladding" with stainless or nickel base alloys are most common. For hardfacing corrosion is mostly combined with other type of wear. Ex Paper and pulp industry where a combination of abrasion and corrosion occurs. Transport screws, mixer blades etc.

Friction
Metal to metal wear under high temperature, pressure and friction.
Shafts, gear teeth, vaults etc. Cobalt alloys are often used for these applications.



TERMINOLOGY

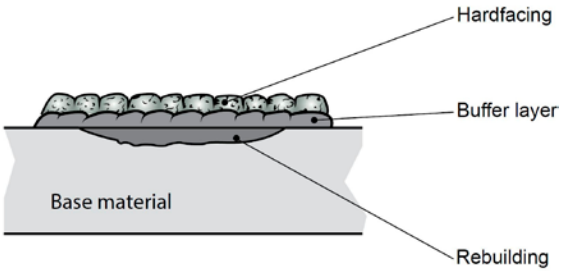
Here we explain a number of important terms to better understand hardfacing.

Rebuilding
When restoring old worn down and damaged material you normally use a filler metal of the same alloy of the base metal. This however depends on the base metal and its compatibility with the filler metal. You need to take in account the service temperature of the part where there can be differences in thermal expansion between the base and the filler metal. Also the risk of cold cracking can be an issue. This however depends on the base material type and if it needs certain preheating and interpass temperatures.

Buffer layer
This is used as a layer between the base material and the hardfacing material for below reasons.

- To create a good bond to the base material
- When welding on old hardfaced surfaces or difficult to weld base materials
- To avoid shrincage cracks from the hardfacing material down to the base metal
- To increase resistance to impact
- To limit dilution
- When you have limitations with preheating.

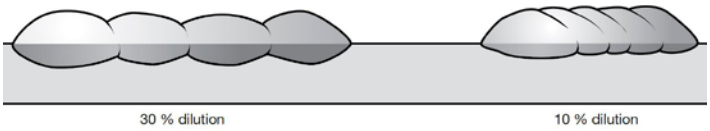
We recommend Austenitic stainless steel buffer layers of 307 type and with high Mn like FD 250K or HMn E.



Hardfacing
Hardfacing is used where parts are exposed to one or many medias.
Abrasive wear, corrosive media, cavitation, impacts, erosion, heat, shocks, pressure or a mix of them all.
The deposit becomes harder than the base material and resistant against the wears its exposed to.
The hardfacing deposit can be of one layer or multiple layers to achieve the right hardness and wear resistance..

Dilution
When hardfacing the goal is to have as little dilution as possible in order to get the deposit as resistant as possible. The more dilution you get the less wear resistant the hardfacing deposit will become due to change of its chemistry. Normally you need to weld 2-3 layers before requested hardness and wear resistance is achieved but this is off course depending on the application. To avoid unnecassary dilution there are a few factors to take in consideration.

- Heat input, the less heat you use the less diltuion. That is why you always wants to weld as cold as possible
- Welding technique, multipass welds give less dilution that single pass beads. Use an overlap of 50% between weld passes to get a good controlled dilution
- Welding speed, higher speed decreases the dilution
- Stick out, normally you use a longer stick out to decrease the dilution
- Polarity, when welding some types of MMA electrodes you can use AC or DC- to get less dilution. Also with some FCW types you can use DC-.



Shrincage cracks
When welding abrasive resistant chromium carbide wires with a lot of hard phases you will get cracks across the weld bead when cooling down. This is perfectly normal but if the part is then exposed to continuous impact loads and shock it can make the cracks continue down to the base material. This can often be avoided with a buffer layer in these cases. Other wires may not be allowed to crack due to the need to guarantee a good anti corrosion resistance. Then the cracking can be avoided by a good combination of preheating and recooling.

Pre heating
Preheating is depending on what base material to be welded. Normally hardfacing applications involve unalloyed steel, low alloyed steel, high alloyed steel and austenitic manganese steels(Hadfield steels). When welding Manganese steels you should not use preheating at all as it can get brittle over 150°C.
Preheating reduces the risk of hydrogen cracking, tensions and gives the heat affected zone a softer structure.
To determine the correct preheating temperature you need to know the carbon equivalent and the composition in the base material.

Carbon equivvalent (Ceq)	Weldability	Preheating	Postheating
Ceq< 0.35	Good	<100°C	Not required
Ceq 0.35-0.6	Ok	150-250°C	Advantage
Ceq >0.6	Special precautions	> 250°C	Required

WORK HARDENING SOLID WIRES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%) C	SI	MN	CR	NI	MO	AL	V	W	NB	TI	HARDNESS
307	ISO 14343-A: 18 8 Mn AWS A 5.9: ER 307Si	0,09	0,9	7	18,5	9	-	-	-	-	-	-	As welded: 200 HB After W-H: 450 HB
For difficult welded steels and stainless steels against regular steels. Joining and hardsurfacing parts, buffer layers before hardfacing to avoid cracks and welding tool steels, manganese steels etc.													
312	ISO 14343-A: 29 9 AWS A 5.9: ER312		0,02	1	0,6	29	0,5	-	-	-	-	-	As welded: 240 HB After W-H: 450 HB
Alloy with high alloy content and high ferrite ratio which allow it to benefit from extreme tolerance to hot cracking and to dilution with a wide range of base materials. Preheat can often be avoided or minimized. The weld deposit workhardens and gives good wear and friction resistance. Examples: Welding stainless steels of similar composition or ferritic stainless steels. Joining stainless steels to mild and low-alloyed steels. Buffer layers before hardsurfacing. Maintenance on hard-to-weld steels. Welding high carbon hardenable steels, of known or unknown composition and generally most of steels subject to cracking such as tool steels, manganese steels, spring steels and high-speed steels.												

IMPACT RESISTANT SOLID WIRES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%) C	SI	MN	CR	NI	MO	AL	V	W	NB	TI	HARDNESS
250	W.N 1.7384 DIN 8555: MSG/WSG 1-GZ-250	0,09	0,55	1	2,6	<0,3	1	-	0,03	-	Rest	<0,1	22-27 HRC 238-266 HB
Cr-Mo alloyed steels (1,5% - 0,5%) resistant to high temperature, wear, pressure and shocks. Good resistance to cracking and to the attack of sulphured agents. Guide rollers, excavators, screw conveyers, gears, moulds, rolling surfaces, etc.													
350	W.N 1.7363 DIN 8555: MSG/WSG 5-GZ-350	0,08	0,5	0,7	6,0	<0,3	0,7	0,02	0,03	-	Rest	-	36-40 HRC 337-372 HB
Cr-Mo alloyed steels (2,5% - 10%) resistant to high temperature, pressure and shocks. Good resistance to cracking and to the attack of sulphured agents. Guide rollers, gears, moulds, excavators, rolling surfaces, crushers, screws, cutting tools, hammers, etc.													
600	W.N 1.4718 DIN 8555: MSG/WSG 6-GZ-60 En 14700: S Fe8	0,45	3	0,4	9,3	0,15	0,15	0,03	0,03	0,1	0,05	0,05	55-60 HRC 550-620 HB
For surfaces where it is required a fairly good impact strength and a good resistance to shocks with medium abrasion. Excavators, mining industry, cylinder crushers hammers, pneumatic hammers, knives, cutting and cold working tools, crumbling jaws, anvils, catepillars, screws, guide rollers, etc.													

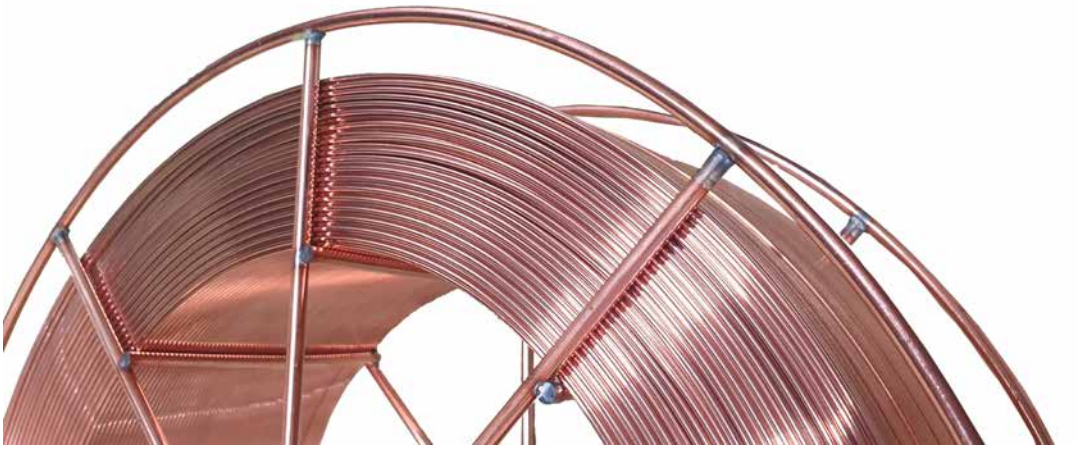
RC1	W.N 1.2367 DIN 8555: MSG/WSG 3-GZ-40P	0,12	0,5	0,7	6,2	<0,2	3,2	-	-	-	-	-	38-42 HRC 370-410 HB
Suitable for Cr-Mo and/or Ni-Cr-Mo alloyed steels for application to hot working parts, subjected to abrasion, compression and hot strokes. Hot shears, moulds, forging, guide rollers, switches, corners, etc.													
RC2	W.N ~ 1.2367 DIN 8555: MSG/WSG 3-GZ-50ST	0,26	0,5	0,7	5,2	<0,2	3,8	-	-	-	-	0,7	45-50 HRC 430-485 HB
Used on Cr-Mo and Ni-Cr-Mo alloyed materials when hardness, resistance to heat on parts subject to friction, compression and good impact strength at elevated temperatures are required. Repairing and restoration of cylinders, conveyor and guide rollers, shear blades, forging, punches, percussion hammers, hot and cold working tools of medium hardness.													
RC3	W.N 1.2343 DIN 8555: MSG/WSG 3-GZ-55ST	0,37	0,4	1,1	7	<0,2	2,2	-	-	-	-	0,3	52-57 HRC 540-590 HB
Used on parts subject to strong abrasion and compression combined with moderate impacts and high temperatures. Used in forges, rollers, cylinders, cogwheels, straightening rollers. The material can be subjected to grinding or processed with tungsten carbide tools.													
RC9	W.N 1.3343 DIN 8555: MSG/WSG 4-GZ-60-S AISI ~ M2	0,9	0,25	0,3	4,2	0,2	5	-	1,8	6,3	-	-	60-64 HRC 620-660 HB
Tungsten - Molybdenum alloyed welding wire suitable for repairing high speed steels like Werkstoff 1.3316, 1.3333, 1.3344, 1.3346. Excellent toughness and cutting properties, for a wide variety of uses. Twist drills, reamers, broaching tools, metal saws, milling tools of all types, wood working tools, cold working tools, gears, punches, shears etc.													
M7	W.N 1.3348 AISI M7	1,0	0,4	0,3	3,8	-	8,6	-	1,9	1,8	-	-	57-64 HRC
For deposit welding of Mo-alloyed high-speed steel. Maintenance and new manufacture of high-speed steel tools. Weld deposit without soft-annealing can only be processed by grinding. To be used for cutting tools, gouges, turning chisel, broaches, taps, twist drills, reamers, milling tools, cold extrusion dies.													
P20	W.N 1.2330 AISI P20	0,35	0,5	0,8	1,7	-	0,45	-	-	-	-	-	34-38 HRC
Chromium - Manganese - Molybdenum welding wire. Large and medium-sized moulds for plastic processing, mould frames for injection moulding and die casting industries, componet for general mechanical engineering.													
4130	W.N 1.2367 AISI 4130	0,3	0,3	0,5	1	<0,2	0,2	-	-	-	-	-	36-40 HRC
High strength low alloy Cr-Mo welding wire used to weld alloys of similar chemical composition. Excellent ductility, good toughness and high stress resistance. Used in aeronautical sector, construction of connecting rods for automotive sector, fixing parts, gears, bolts, axes, etc.													
A2	W.N 1.2363 AISI A2	1,0	0,3	0,55	5,2	-	1,1	-	0,25	-	-	-	55-59 HRC
Suitable for the welding of cold work tool steel with high resistance to wear and good machining properties. Cutting tools, blanking and punching tools, shear blades, pulleys, measuring instruments, etc.													
H13	W.N 1.2344 AISI H13	0,4	1	0,4	5,2	-	1,4	-	1	-	-	-	54-60 HRC
Welding wire for hot work tool steels with excellent hot tensile properties, high hot wear resistance. Heat checking resistance. Used in particular to repair mandrels, punches, dies, cylinder crushers, screws, hammers, pneumatic hammers, etc.													
2343	W.N 1.2343 En 14700 S Fe3	0,38	1,0	0,4	5,0	0,15	1,1	-	0,45	-	-	-	52-57 HRC
For deposit welding of hot work steel. Maintenance and new manufacturing of hot forming tools for operating temperature up to 550° C. For hot shears, die casting moulds, bottom dies, etc.													
2567	W.N 1.2567 En 14700 S Fe3	0,3	0,25	0,4	2,5	0,15	-	-	0,6	4,5	-	-	41-46 HRC
For repairs of hot forming tools as well as for reinforcement of work surfaces. To be used for anneal cuts, forging dies, etc.													
8405	W.N 1.8405 En 14700 S Fe2	0,7	0,45	1,9	1	0,15	-	0,1	-	-	-	0,2	36 HRC
For medium-hard wear resistant deposit on wear parts under pressure, impact abrasive stress. Finishing by grinding is possible. Application with dies, bottom dies, striking tools, crawler running gear parts, etc.													
15CDV6 (SCVS)	EN 4334 15CrMnMoV5-4-9-3 AIR 9117 15CDV6	0,14	0,15	1,0	1,4	-	0,9	-	0,25	-	-	-	42 HRC
A low carbon alloy with high yield strenght superior to 4130 alloy. Good toughness and used in both aerospace and in motorsports for roll cages, pressure vessels, suspensions, rocket motor casings and also for hardfacing of tools steels.													

NICKEL BASE ALLOYS SOLID WIRES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)													
		C	SI	MN	CR	NI	MO	AL	CO	W	NB	TI	CU	FE	HARDNESS
55	AWS A5.14: E NiFe-Cl DIN 8573: SG NiFe-1	0,03	0,2	0,5	-	55	-	-	-	-	-	-	-	Rest	-
Ferro-nickel alloyed filler metal for welding and repairing of grey, malleable, nodular and phosphorus cast iron. Good flow of the weld metal and excellent welding characteristics. Foundry defects, repair on engine blocks, gearboxes, valve bodies, pump bodies etc.															
61	ISO 18274: NiTi3 - S Ni 2061 AWS A5.14: ER Ni-1	0,02	0,5	0,4	-	Rest	-	-	-	-	-	3,3	-	-	-
Weld deposit consists of pure nickel. Recommended for cold welding and repairing of grey cast iron, repairing of cracks. Good bonding and flow of the weld metal and can be used as buffer strings before using a ferro-nickel wire. Repair of engine blocks, frames of tool machines, valve and pump bodies. Also used for surfacing of steel as it has good corrosion resistance, particularly in alkalies.															
60	ISO 18274: S-NiCu30Mn3Ti AWS A5.14: NiCu-7	0,03	0,4	3,5	-	Rest	-	-	-	-	-	2,2	29	-	-
Nickel and copper alloyed wire for welding and hardfacing copper-nickel alloys and copper-nickel plated steels such as Monel 400, CuNi 90/10, CuNi 70/30 and CuNi30. Also for above grades against carbon steels.															
82	ISO 18274: S-Ni 6082 (NiCr20Mn3Nb) AWS A5.14: ER NiCrFe-3	0,03	0,2	3,2	20,5	Rest	-	-	-	-	-	0,3	2,3	2	-
NiCr-alloyed wire for welding of high nickel content alloys such as inconel 600 and Incoloy 800. Used for dissimilar joining of low alloyed steel, stainless steel, nickel steel and cast iron. Used in cryogenics, repair of difficult to weld steels and petro chemical applications.															
625	ISO 18274: S-Ni 6625 (NiCr22Mo9Nb) AWS A 5.14: ER NiCrMo-3	0,01	0,15	0,1	22	Rest	8,7	-	-	-	3,6	-	-	0,3	-
Used for high temperature strength and structural stability, resistance to general corrosion, pitting, crevice and stress corrosion cracking in severe chloride media. For welding of alloy 625, alloy 825, alloy 25-6MO, and a wide range of high alloy austenitic and super austenitic stainless steels. It is also used for surfacing of steel, for welding 9% Ni steels, and for welding various corrosion-resistant alloys.															
C-276	ISO 18274: S-Ni 6276 (NiMo16Cr15Fe6W4) AWS A5.14: ER NiCrMo-4	0,02	0,05	0,4	16	Rest	16	-	-	3,5	-	-	-	6,0	-
Nickel alloyed wire for welding of high nickel content alloys such as Hastelloy C-276, NiMo16Cr15W. Excellent resistance to chlorides, acids and corrosion. Equipment for chemical industry and piping.															
622	ISO 18274: S-Ni 6022 AWS A 5.14: ER NiCrMo-10	0,01	0,0	0,2	22	Rest	14	-	2,5	3	-	-	-	4,6	-
Nickel alloyed welding wire for welding steels such as C-22, 625, Incoloy 25-6 and Incoloy 825. Similar to C4 and C-276 alloys but with higher Cr that makes it useful in a broader spectra. Its very much suited for dissimilar welds of stainless, nickel, carbon steel and other low alloyed steels. The high Cr-halt combined with tungsten and Mo gives a very good resistance to corrosion and rust.															
59	ISO 18274: S-Ni 6059 AWS A 5.14: ER NiCrMo-13	0,01	0,1	0,5	23	Rest	16	0,4	-	-	-	0,5	-	1,5	-
Nickel alloyed welding wire for welding of Alloy 59, C-276, 625, Incoloy 800 and 825 or other nickel alloyed steels at lower temperature. Also used for joining of austenitic duplex and super-duplex steels. Often used in offshore industry, boilers, containers and pipe systems in chemical and petro -chemical industry.															
686	ISO 18274: S-Ni 6686 AWS A 5.14: ER NiCrMo-14	0,01	0,01	0,2	20,6	Rest	16,2	0,2	-	3,9	-	0,1	-	1,0	-
686 is an austenitic Ni-Cr-Mo-W alloy offering outstanding corrosion-resistance in a range of extreme environments. It can be used to overmatch 59, 622, C276 and 625. It is also used for dissimilar welds in superaustenitic and superduplex stainless steel or combinations of these with Ni base alloys. The high alloy levels of Cr-Mo-W ensure exceptional resistance to pitting, crevice and general corrosion.															

COPPER ALLOYS SOLID WIRES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)								
		CU	AL	SN	MN	NI	P	FE	TI	HARDNESS
CuSn6	ISO 24373 CuSn6P Cu5180	Rest	-	6	-	-	0,2	-	-	80 HB
Used for build-up and join welding on CuSn alloys, CuSnZnPb cast alloys and cast iron.										
CuSn12	ISO 24373 CuSn12P Cu5410	Rest	-	12	-	-	0,2	-	-	120 HB
Suitable for all welding processes. The weld metal achieves high hardness corresponding to a cast bronze, so it's used for particularly wear-resistant coatings as well as for join welding and repairs on bronzes.										
CuAl8	ISO 24373 CuAl7 Cu6100	Rest	8	-	0,1-0,3	0,1-0,5	-	-	-	100 HB
Suitable for welding and hardfacing aluminium bronzes, steel and galvanized steel. Very good corrosion and wear resistance. Preheating is recommended for large workpieces.										
CuAl8Ni2	ISO 24373 CuAl8Ni2Fe2Mn2 Cu6327	Rest	7,5-9,5	-	0,5-2,5	0,5-3	-	0,5-2,5	-	140 HB
Used for join welding between steel and CuAl alloys. High wear and abrasion resistance. Very good corrosion resistance against seawater. High pressure resistance, especially with solenoid valves.										
CuAl8Ni6	ISO 24373 CuAl9Ni5Fe3Mn2 Cu6328	Rest	8,5-9,5	-	1-2	4-5	-	3-3,5		>200 HB
Used for welding cast and forge parts made of nickel-aluminum-bronze in shipbuilding (ship propellers, etc.), parts for power stations including valves, sieves, pumps, pipe systems, as well as for apparatus engineering and food containers. Buildup welding on steel and AlBz, including multi-material alloys. The weld metal is resistant to seawater and corrosion and is also resistant to wear (for example, simultaneous exposure to seawater, cavitation, and erosion).										
CuAl10	ISO 24373 CuAl10Fe Cu6180	Rest	8,5-11	-	-	-	-	<1,5		140 HB
CuAl10 is a standard CuAl welding filler according to the AWS, which is particularly suitable for CuAl materials. High wear and abrasion resistance. Well suited for build-up welding on ferritic-perlitic steels and cast iron. Light and good-flowing weld pool.										
MX 300 (CuMn13Al)	ISO 24373 CuMn13Al8Fe3Ni2 Cu6338	Rest	8	-	11-14	1,5-3	-	2-4	-	290 HB
MX 300 is a high-strength welding wire, also spark-proof. Resistant to seawater, wear, and abrasion. Resistant to cavitation and erosion. Buildup and join welding on aluminum bronzes. Especially for ship propellers, slide rails, raceways, valve control housings.										
CuNi30	ISO 24373 CuNi30Mn1FeTi Cu7158	Rest	-	-	0,6-1	30	-	0,4-0,7	0,3-0,5	115 HB
CuNi30 is well suited for highly stressed, corrosion-resistant buildup welds on cast iron and on unalloyed and low-alloy steels, as well as seawater-resistant CuZn alloys. Well suited for welding on CuNi materials. Especially recommended in the area of plant construction.										



COBALT BASE SOLID WIRES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%) C	SI	MN	CR	NI	MO	AL	V	W	CO	FE	HARDNESS
Co1	DIN 8555 MF 20 GF 55 CTZ EN 14700 Co3 AWS A5.21 ERCCoCr-C	2,5	0,3	0,8	29	0,2	0,1	-	-	12	rest	<5,0	20°C 55 HRC 600°C 44 HRC 800°C 34 HRC
Hardest deposit of all standard cobalt alloys, excellent resistance to corrosion, reducing acids, impact, extreme wear and tempearture shocks. Retains hardness at temperatures over 760°C. Pump sleaves, transport screws, wear pads.													
Co6	DIN 8555 MF 20 GF 40 CTZ EN 14700 Co2 AWS A5.21 ERCCoCr-A	1,2	0,5	0,8	28	0,3	0,1	-	-	4,5	rest	<5,0	20°C 40-43 HRC 300°C 35 HRC 600°C 29 HRC
Mostly flexible and widely used alloy due to overall performance. Retains hardness at temperatures up to 500°C. Steam and chemical valves, shear blades, pumps for high temperature liquids, paper and pulp applications.													
Co12	DIN 8555 MF 20 GF 50 CTZ EN 14700 Co2 AWS A5.21 ERCoCr-C	1,5	0,9	1	27,5	0,2	0,1	-	-	8	rest	<5,0	20°C 45-47 HRC 300°C 37 HRC 600°C 32 HRC
High resistance to corrosion and galling at elevated temperatures. Retains hardness up to 700°C. Common in the wood industry for large band saw blades, chain saw bars etc.													
Co21	DIN 8555 MF 20 GF 300 CKTZ EN 14700 Co1 AWS A5.21 ERCCoCr-C	0,25	0,7	0,6	27,5	2,1	5,5	-	-	0,1	rest	<5,0	30 HRC work hardening 45 HRC
High corrosion and thermal resistance. The alloy is machinable. Steam valves, hot shears, chemical and petrochemical valves, forging dies etc.													
Co25	DIN 8555 MF 20-300-CKTZ EN 14700 Co1	0,1	<1	<1,5	20	10,0	<0,5	-	-	15,0	rest	-	24-27 HRC
Exceptional thermal fatigue resistance and useful for tools to work hot steel. The alloy also resists hot metal on metal wear. The deposited weld metal with has an excellent strength, good oxidation resistance up to 980°C, very good sulfidation resistance, and relatively good resistance to wear and galling.													
Co190	-	0,35	0,5	0,8	1,7	-	0,45	-	-	-	-	-	50-62 HRC
Co190 is similar to Co1 but slightly harder. It has a large volume of chromium carbides in a cobalt matrix, giving the alloy excellent resistance to abrasion and solid particle erosion. It can be machined with difficulty using carbide tools or ground. It bonds well with stainless and other weldable alloy steels. Used for drilling tools, drill bits and other mining applications.													

COBALT BASE APPLICATIONS

Applications/Wear	Abrasive	Corrosion	Erosion	Oxidation	Abrasive wear	Cavitation	Impact	Heat	Thermal Shock	Fatigue	Fretting	Cutting	Alloy
Steel													
Sheet and scale breaker roller	+	+			+			+					Co12
Tube mill- Piercing plugs	+		+		+				+				Co6, 21
Soaking pit - tong bits	+							+	+				Co1, 6, 12
Bar mill - twwist & guide rolls					+		+	+	+				Co12
Hot shears					+			+	+				Co6, 21
Galvanized rolls		+			+			+					Co6
Forging and pressing													
Forging dies & hot work tools			+				+	+	+	+			Co6,, 21
Cold work tools, pressing												+	Co1, 12
Power generation													
Steam valves			+			+		+					Co6
Erosion shields			+			+		+					Co6
Valves, pumps etc	+	+	+		+			+					Co1, 6, 12, 21, 25
Cutting													
Chain saw bars					+			+	+				Co6, 12
Scraper knives	+	+											Co6, 12
Saw tipping	+				+			+	+				Co12
Knives (carbet, rubber)	+	+			+			+					Co6, 12
Cutter rolls	+	+											Co12
Aircraft													
Turbine blade tipping			+					+					Co12
High pressure blade			+					+					Co6
Gas turbine lock plates				+							+		Co25
Timber, paper, pulp													
Tipping saw blades	++	+											Co12
Chain saw guide bars	+	+			+								Co12
Chipping knives	+	+											Co12
Hydropulper disc segments	+	+						+					Co1
Rotary feeder	+	+											Co6, 12
Paper slitters, knives	+												Co12
Petrol engine													
Valve seats, steam tips	+	+	+		+			+	+	+			CO6, 12
Combustion engines													
Valve seats, cages, rocker pad	+	+	+		+			+	+	+			Co6, 12
Crossheads					+			+	+				Co1
Shipbuilding													
Bearings for rudder stocks	+	+			+								Co6
Rudders, stabilizers, hydro-planes	+	+			+								Co6
Chemical & petrochemical													
Valves, seats, discs, gates	+	+	+		+			+					Co1, 6, 12, 21, 25
Pumps: Impellers, rotors, seals	+		+		+	+		+					Co1, 6, 12, 21, 25
Pumps: Balancing drums, shafts	+		+		+	+		+					Co1, 6, 12, 21, 25
Agitators: Bearings & paddles	+	+			+			+					Co6
Screws: Conveyor & extruders	+	+	+		+			+					Co6, 12
Oil drilling: Rock bits	+				+								Co1, Co190
Rubber													
Fly & dead knives	+												Co12
Mixer rotors, bodies & tips sides	+	+	+					+					Co1, 6
Others													
Screws, sewage, plastic extrusion	+	+			+			+					Co1, 6, 12
Centrifuge screw flights	+	+			+			+					Co1
Mechanical seals		+		+									Co6, 12
Brick trimming dies	+												Co6

WORK HARDENING CORED WIRES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)												
		C	SI	MN	CR	NI	MO	TI	V	W	NB	CO	FE	HARDNESS
707	DIN EN 14700: T Fe10 ISO 17633-A T 18 8 Mn R M21/C1 3	0,1	0,9	6	19	9,5	-	-	-	-	-	-	Rest	As welded: 170-200 HB After W-H: 500 HB
Routile flux cored wire for difficult welded steels and stainless steels against regular steels. Joining and hardsurfacing parts, buffer layers before hardfacing to avoid cracks and welding tool steels, manganese steels etc.														
FD 200K	DIN EN 14700: T Fe-10-200-CKNPZ DIN 8555: MF 8-200-CKNPZ	0,1	0,5	6	19	8,5	-	-	-	-	-	-	Rest	As welded: 180-200 HB After W-H: 400-450 HB
Flux core wire of the CrNiMn-type (1.4370). The complete austenitic weld material shows high plasticity and can be applied as a buffer layer. The deposits can be work hardened, are heat resistant up to 850° C, stainless and not magnetic. FD 200 K is suitable for welding steels with more than 0.7 % C and other difficult combinations, because it deposits a most ductile weld metal. The deposits resist high shrinkage and impact stresses. Repair of: manganese steel buckets and shovels, high tensile tools and dies, clutches, crane wheels, earthmoving undercarriage parts, gear wheels, etc.													
FD 240K	DIN EN 14700: T Fe9-250-KNP DIN 8555: MF 7-250-KNP	1,1	0,3	14	4	0,6	-	-	-	-	-	-	Rest	As welded: 200-230 HB After W-H: 400-450 HB
FD 240 K is a flux core wire, which enables the deposition of a non magnetic austenitic 14 % Mn coating, which is tough, crack free and and can be work hardened up to 450 HB. FD 240 K is designed for repairing worn parts of similar base materials as well as for hard facing carbon steels parts to severe impact loads. In that case an austenitic buffer layer should be applied. The alloy should be welded with a minimum heat input in one or more layers. Hardfacing of crushers, swing hammers, railway crossings, dredge buckets, etc.														
FD 250K	DIN EN 14700: T Fe9 DIN 8555: MF 7-250-KNP	0,5	0,5	16	14	1,2	0,6	-	-	-	-	-	Rest	As welded: 230-260 HB After W-H: 450-500 HB
FD 250 K is a flux core wire of the Mn-Cr-type. The complete austenitic weld material shows high plasticity and can be applied as a buffer layer. Deposits can be work hardened up to 500 HB, are stainless and not magnetic. The deposits resist high shrinkage and impact stresses. Repair of manganese steel buckets and shovels, high tensile tools and dies, clutches, crane wheels, earthmoving undercarriage parts, gear wheels, etc.														
FD 295 HY	DIN EN 14700: T Fe9 DIN 8555: MF 7-250-KNP	0,2	<3	9-11	18-20	-	-	-	-	-	-	9-11	Rest +N	As welded: 280-300 HB After W-H: 450 HB
The deposit of FD 295 HY is a stainless material with special alloys. The austenitic deposit is resistant against corrosion, erosion and cavitation and has a high resistance to hot cracking. The deposit has a much longer lifetime than other used conventional alloys like Stellite, 13Cr – 4 Ni or martensitic Chrome- steels. Typical applications are coatings on parts with cavitation and erosion wear like water-turbines or hydraulic or gas system components.														
312	EN ISO 17633-A: T 29 9 R M21/C1 3 AWS A5.22: E312T0-1/4	0,1	0,8	1,3	29	8,6	0,3	-	-	-	-	-	-	As welded: 240 HB After W-H: 450 HB
Flux cored wire with high alloy content and high ferrite ratio which allow it to benefit from extreme tolerance to hot cracking and to dilution with a wide range of base materials. Preheat can often be avoided or minimized. The weld deposit workhardens and gives good wear and friction resistance. Examples: Welding stainless steels of similar composition or ferritic stainless steels. Joining stainless steels to mild and low-alloyed steels. Buffer layers before hardsurfacing. Maintenance on hard-to-weld steels. Welding high carbon hardenable steels, of known or unknown composition and generally most of steels subject to cracking such as tool steels, manganese steels, spring steels and high-speed steels.													




IMPACT RESISTANT CORED WIRES Meltolit

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)												
		C	SI	MN	CR	NI	MO	TI	V	W	NB	CO	FE	HARDNESS
725	DIN EN 14700 T Fe1	0,07	0,5	1,3	1,6	-	0,2	-	-	-	-	-	Rest	250 HB
Meltolit 725 is used for rebuilding of worn hardened steel parts subject to high compressive stresses and heavy impacts. It can also be used as a buffer layer on ferritic steels before hardfacing with wires providing higher abrasion resistance. Transmission shafts, gear teeth, conveyor chains, wheels of rolling bridges, bearing tracks, forgings and dies etc.														
730	DIN EN 14700 T Fe1	0,15	0,7	1,5	2	-	0,2	-	-	-	-	-	Rest	350 HB
Meltolit 730 is used for surfacing and rebuilding parts subjected to high impact and high compressive stresses. Track pads and rollers, moulds, dies, gear teeth, mill roll coupling shaft ends, rail tracks etc.														
740	DIN EN 14700 T Fe2	0,4	0,7	1,5	2,5	-	0,5	-	-	-	-	-	Rest	450 HB
Meltolit 740 is used for surfacing and rebuilding parts subjected to impact and high compressive stresses. Build-up of earthmoving equipment such as tractor rollers, idlers, chains and drive sprockets, excavator pads, electric shovel track carrier rolls, steel shafts, gear teeth, crane wheels, steel mill rolls, mine car wheels, dredge pins, dredge links, mixer parts, rail car couplings, steel mill roll couplings and any components subject to metal-metal wear.														
FD 495	DIN EN 14700 T Fe8-50-CKTZW DIN 8555 MF 3-GF-50-CKTZW	0,1	0,7	0,4	15	-	3,2	-	-	-	-	14,0	Rest	As welded: 48-50 HRC After W-H: 53 HRC
The stainless weld deposit on Fe, Cr, Co, Mo-basis has a high wear resistance even at elevated temperatures, a high tensile strength and a high resistance against sliding wear of metallic objects. Deposits can be work hardened up to 53 HRC and show good thermal shock resistant. Hardfacing of forging presses, hot piercing dies, stretching rolls, pinch rolls, hot strip mill table rolls and back-up rolls.														
FD 580	DIN 8555 MF 6-50-PT	0,25	0,6	1,8	6,5	-	1,5	-	0,3	1,2	-	-	Rest	48-52 HRC
This C-, Cr-, Mo-, W- alloyed flux cored wire is suitable for hardfacing areas that require a deposit that is durable and abrasive resistant. Preheating when welding FD 580 is solely dependant on the base material. With complex base materials, a buffer layer should be used. Guiding rolls, Shredders, Hot working tool steels.														
760	DIN EN 14700 T Fe2	0,5	0,7	1,2	6	-	0,7	-	-	-	-	-	Rest	55-60 HRC
760 is a metal cored wire used for hardsurfacing components that is subject to impact, pressure and shocks. Bucket teeth, bucket lips, bulldozer blades, crusher jaws, scraper blades, chutes, pump housings, conveyor screws, slide plates, gear teeth, crusher hammers, drilling bits, ploughshares, reamers etc.														
FD 600	DIN EN 14700 T Fe8 (MF 6-55-PT)	0,5	1	3	6,5	-	0,8	-	0,4	-	-	-	Rest	55-58 HRC
FD 600 is a flux core wire which enables a CrMoV alloyed deposit for semi automatic and automatic surfacing. The weld metal enables hardness up to 58 HRC even with relatively slow cooling rates. Crack resistance is good in case of adequate preheat and interpass temperature together with slow cooling after welding. Resistance to tempering is good. Parts subjected to abrasion, impact and compressive loads, sand pumps, dredge pump parts, dredge ladder rolls, etc.														
FD 600 TIC	DIN EN 14700 T Fe8-60-GP	1,8	1,6	1,4	7	-	1,4	5	-	-	-	-	Rest	56-58 HRC
FD 600 TIC is a flux core wire with tough deposit, not sensitive to impact loads. It shows excellent resistance to impact in combination with abrasion. Roller presses, bucket teeth and lips, sand pumps, impellers and screws.														
FD 601	DIN EN 14700 T Fe6-60-PT DIN 8555 MF 6-60-PT	0,5	1	3	6,5	-	1,5	-	1,5	1	-	-	Rest	55-58 HRC
FD 601 is a flux core wire which enables a CrMoWV alloyed deposit for semi automatic and automatic surfacing. The weld metal enables hardness up to 60 HRC even with relatively slow cooling rates. Crack resistance is good in case of adequate preheat and interpass temperature together with slow cooling after welding. Resistance to tempering is good. Parts subjected to abrasion, impact and compressive loads, sand pumps, dredge pump parts, dredge ladder rolls, tool - joints , etc.														
FD 609	DIN EN 14700 T Fe8-55-RP DIN 8555 MF 6-55-RP	0,5	2,8	1,2	9,5	0,3	-	-	-	-	-	-	Rest	55-57 HRC
High Cr-alloyed flux core wire for wear resistant hardfacing with a ferritic – martensitic micro structure. The welding deposit is high resistant against impact stress and medium abrasion. The deposit is despite the high hardness crack free also in multiple layers and can be used up to 700° C. Crusher wheels and hammers, rock processing shredders, cutting-tools, and fluid valves and protection welding on Mn-Hadfield-steel.														

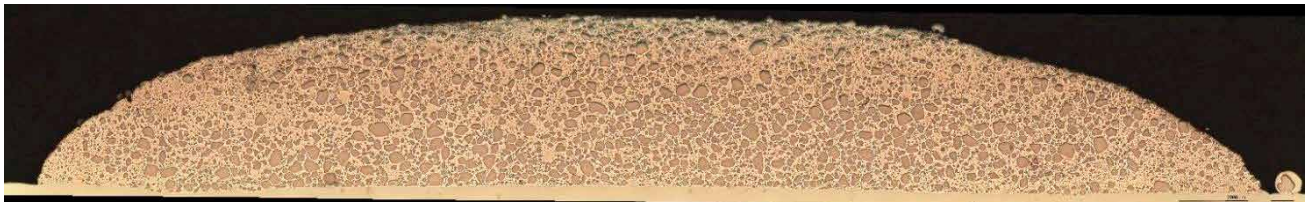
ABRASION RESISTANT CORED WIRES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)												
		C	SI	MN	CR	NI	MO	TI	V	W	NB	CO	FE	HARDNESS
FD 42	DIN EN 14700 T Fe14-45-CGT	1,9	1	1,0	28	3	0,8	-	-	-	-	-	Rest	41-44 HRC
FD 42 is a flux cored wire for hardfacing with resistance to wear and corrosion. The deposit is high Cr-, Ni-, Mo-, and C-alloyed and is used at any place where corrosive as well as abrasive wear is expected. Welds can be carried out crackfree. The alloy can be worked with metalloid cutting tools. Vegetable oil extrusion presses, meat processing and food industry, chemical industry.														
FD 51	DIN 8555 MF 10-50-G DIN EN 14700 T Fe 15-55-G	4,5	1,2	0,4	21	-	-	-	-	-	-	-	Rest B+	58-59 HRC
Flux cored wire with excellent resistance to abrasion and medium impact up to 450°C. Best result by welding two layers. The resulting deposits can not be heat treated, machined or forged. Waste crushers, shredder equipment, conveyor screws, pumps, mixer parts, shovel-buckets, scrapers, fan blades etc.														
FD 55	DIN 8555 MF 10-60-GR DIN EN 14700 T Z Fe14-60-G	4,8	1,2	0,6	29	-	-	-	-	-	-	-	Rest	55-59 HRC
FD 55 is a flux core wire which deposits a high CrC-alloyed stainless weld metal with excellent resistance to abrasion and medium impact. It can be used whenever high abrasion accompanied by corrosion is expected. Best results are achieved by welding in two layers. A maximum deposit thickness of 8 mm is recommended. The resulting deposits can not be heat treated, machined or forged. Piping, impellers and transport screws.														
FD 55 Mo	DIN 8555 MF 10-60-GT DIN EN 14700 T Z Fe14-60-GT	5	1,7	0,4	27	-	1,2	-	-	-	-	-	Rest	57-60 HRC
FD 55 Mo is a flux core wire, which deposits a high C-Cr-Mo-alloyed stainless weld metal with excellent resistance to abrasion and medium impact. It can be used whenever high abrasion accompanied by corrosion is expected. The additional alloyed 1.3 % Mo enables a higher warm strength of the deposit in comparison to FD 55. Best results are achieved by welding in two layers. A maximum deposit thickness of 8 mm is recommended. The resulting deposits can not be heat treated, machined or forged. Bucket teeth and lips, sand pumps (wet sand possible), catalyst piping, impellers and transport screws.														
FD 59 L	DIN 8555 MF 10-60-CGT DIN EN 14700 T Z Fe14-60-CG	3,8	1,2	0,2	33	-	0,5	-	-	-	-	-	Rest	57-59 HRC
FD 59 L is a flux core wire, which deposits a high CrC-alloy. It can be used whenever high abrasion accompanied by corrosion is expected. It is not recommended for impact wear conditions. FD 59 L is deposited crack free by controlling the operational conditions. It is recommended that the work piece be preheated up to 450°C and this temperature maintained throughout the complete welding process. After Welding, the component should be cooled slowly preferably in the furnace. Best results are achieved by welding in two layers. A maximum deposit thickness of 8 mm is recommended. The resulting deposits cannot be heat treated, machined or forged. Hardfacing on pumps, mixers, impellers and screws, particularly when these parts are subject to wear by abrasion and corrosion.														
FD 60	DIN EN 14700 T Z Fe15-60-G	5,2	1,1	0,2	22	-	-	-	-	-	7	-	Rest	61-63 HRC
FD 60 is a flux core wire for hardfacing especially for extreme abrasive wear. The deposit has a ledeburitic structure with different very hard types of carbide. FD 60 is used where ever abrasive wear is extremely high because it offers an excellent resistance against abrasion. The deposit is free of slag, weldability is excellent. Best results are achieved by welding in two layers. A maximum deposit thickness of 8 mm is recommended. The resulting deposits cannot be heat treated, machined or forged. Hardfacing on parts for coal mining equipment, cement and mineral industries.														
FD 61	DIN 8555 MF 10-65-G DIN EN 14700 T Z Fe15-65-G	5,2	1,3	0,2	22	-	-	-	-	-	7	-	Rest +B: 1,0	62-65 HRC
FD 61 is a flux core wire for hardfacing and is resistant to extreme abrasive wear. The deposit has a ledeburitic structure with a high content of different hard phases. FD 61 is used at extreme abrasive wear due to its excellent resistance against abrasion. The deposit is free of slag, weldability is excellent. Best results are achieved by welding in two layers. A maximum deposit thickness of 8 mm is recommended. The resulting deposit cannot be heat-treated, machined or forged. Hardfacing on parts for coal mining equipment, cement and mineral industries.														
FD 62	DIN 8555 MF 10-60-G DIN EN 14700 T Z Fe15-60-G	5,4	1,2	0,2	27	-	-	-	-	-	3	-	Rest	60-63 HRC
FD 62 is a high C-Cr-alloyed flux core wire. The alloy is especially made for overlaying parts which are exposed to very extreme abrasive mineral wear related to the high amount of hard phases like hypereutectic M7C3-carbides. For best results avoid to apply the hardfaced area to pounding or impact load. FD 62 should be applied in 2 layers with a maximum height of 10 mm. Wear plates, spiked rollers, cement and concrete pumps, dredging teeth, slag breakers, coke oven slides and Ni-Hard IV.														
FD 64	DIN 8555 MF 10-65-GZ DIN EN 14700 T Fe16-65-GZ	5,0	1,2	0,2	26	-	-	-	0,8	1	-	-	Rest +B: 1,0	63-65 HRC
FD 64 is a C-Cr-B-alloyed flux core wire resistant to heavy mineral abrasion at elevated temperature. Cement industry, mineral and brick industry, mining industry and parts subject to heavy wear in combination with temperature.														

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)												
		C	SI	MN	CR	NI	MO	TI	V	W	NB	CO	FE	HARDNESS
FD 65	DIN 8555 MF 10-65-GZ DIN EN 14700 T Fe16-65-GTZ	5,2	1	0,2	21	-	7	-	1	2	7	-	Rest	63-65 HRC
FD 65 is a flux core wire for hardfacing application especially with extreme abrasive wear even at elevated temperatures. The deposit has a ledeburitic structure with many different very hard types of carbides. FD 65 is used where extreme abrasive wear is expected even at elevated temperatures up to 600°C. The deposit is free of slag, weldability is excellent. Best results are achieved by welding in two layers. A maximum deposit thickness of 8 mm is recommended. The resulting deposits cannot be heat treated, machined or forged. Blast furnace bells, coke oven screens and doors, sinter wheel breakers, smelter loading chutes, etc.														
FD 75	DIN 8555 MF 10-65-GZ DIN EN 14700 T Fe16-65-GZ	5,2	1,2	0,6	21	-	4	-	0,6	1,2	6,2	-	Rest	62-64 HRC
The deposit has a ledburic structure with many different types of cabides. FD 75 is used where extreme abrasive wear is expected even at elevated temperatures up to 600-700°C. The deposit is free of slag, weldability is excellent. Best results are achieved by welding in 2 layers. The resulting deposit cannot be heat treated, machined or forged. Slag conveyor screws, scrapers, hot sinter breaker														
FD 78	DIN 8555 MF 10-70-G DIN EN 14700 T Fe16-70-G	5	1,3	0,5	16	-	-	-	6	-	6,5	-	Rest +B: 1,2	64-68 HRC
C-, Cr-, V-, Nb-alloyed flux core wire against extreme mineral wear. The weld deposit has a high scratch hardness. Best results are achieved by welding two layers. A maximum deposit thickness of 8 mm is recommended. The resulting deposits cannot be heat-treated, machined or forged. Applications are sinter plants, lignite mining machines, gravel industry, chains, clinker industry, concrete pumps.														
FD 79	DIN 8555 MF 10-70-G DIN EN 14700 T Fe16-70-G	5	1	-	21	-	-	-	2,5	-	6	-	Rest +B: 1,3	64-68 HRC
FD 79 is a self-shielded flux-cored wire, with a high amount of chrom-, vanadium and niobium carbides as well as extra hard metal borides. According to the high content of alloy components the hard facing resists mineral wear even at elevated temperatures. Wear resistance will be given up to and service temperature of approx. 650 °C. Best results will be achieved by welding in two layers. The hard facing should not be loaded with impact or shock stress. Sand- and concrete pumps, mixer parts, conveyer screws, Hardfacing on parts for coal mining equipment, cement and mineral industries.														
FD 720	DIN EN 14700 T Fe13-65-G	0,7	1	2	-	2	-	-	-	-	-	-	Rest +B: 4,5	64-66 HRC
C-Ni-B alloyed flux cored wire. The weld deposit is suitable for parts subject to metal to metal friction and severe fine particle abrasion/erosion load. It is rich in iron. borides and ironcarbides. Welds have a high hardness even at the first layer and also on stainless steel. Single layer welding is recommended.														
FD 721	DIN EN 14700 T Z Fe8	1,5	1	2	16	-	-	-	-	-	-	-	Rest +B: 3,5	64-66 HRC
Flux cored wire with alloyed Fe-B-Cr-weld metal with a martensitic carbide structure. It is suitable for highly abrasion resistant hardfacings that are exposed to high wear at elevetad temperatures up to 450°C. Due to its high hardness the hardfacing should not exceed 4mm thickness. Feed screws, sand preparation plants, wear plates, ceramic industry.														
FD 723	DIN EN 14700 T Z Fe8	1,6	1,4	0,2	7,5	-	-	-	-	-	-	-	Rest +B: 4,6	65-70 HRC
Flux cored wire with alloyed C-Cr-B weld metal with a martensitic carbide structure with additional iron- and chrome borides. Welds have a high hardness even in the first layer and also on stainless steel. Maximum operating temperature is 450°C.														
FD 733	DIN 8555 MF 10-70-GT DIN EN 14700 T Z Fe12-70-G	4	0,8	1,5	19	-	-	-	-	-	4	-	Rest +B: 1,4	66-68 HRC
FD 733 is a flux core wire containing extremely hard chrome-carbides and niobium-carbides embedded in a FeBC matrix. The weld deposit is very fine-grained and extremely hard – also in the first layer 67 HRC can be achieved. It is suitable for hardfacing on parts requiring high abrasion resistance with at the same time minor impact resistance and wear resistance up to a working temperature of approx. 450 °C. Worm conveyer screws, sand-preparing plants, dredgers, mixers, ceramic industry, fan baffles, pump casings, briquette plants etc.														
FD 739	DIN EN 14700 T Fe16-70-CG	1	-	-	20	-	3,3	-	-	5,7	3,4	-	Rest +B: 4,4	67-70 HRC
FD 739 is an iron based flux cored wire containing complex carbide phases which are precipitated more fine than in common used hardfacings. These layers show a better resistance against abrasive and erosive load because of the finely divided hard particles which have a submicron grain size. This fine structure results of the advantage concerning the percentage contact area of the fine hard phases in comparison to common hard phase grain sizes. Used on parts with high abrasive and erosive load, which could be superposed by corrosive attack.														

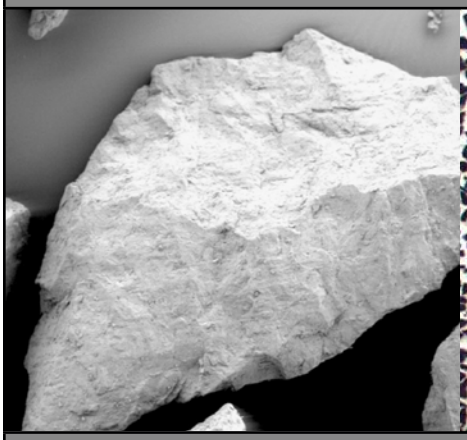
TUNGSTEN CARBIDES CORED WIRES

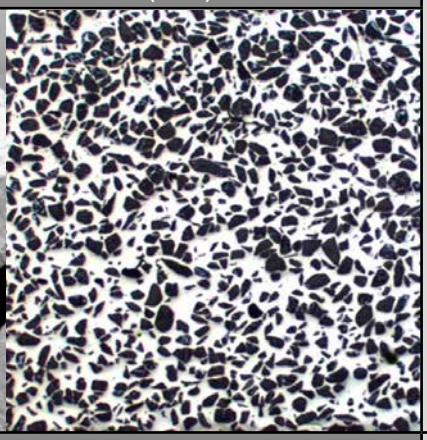
PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)	HARDNESS
NIFD	DIN EN 14700 T Ni20 DIN 8555 MF21-55-CGZ	Ni-Matrix with 50-62% FTC	FTC: 2,360 HV Matrix: 450-480 HV
NIFD is a flux cored wire filled with fused tungsten carbide and NiCrBSi- matrix for semi-automatic welding application. NIFD was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. The deposit alloy consists of approximately 60% FTC and 35 - 40% Ni-Cr-B-Si-matrix. The alloy has a low melting range of between 900 – 1050°C (1,652 – 1,922°F) and feature a self fluxing characteristic producing a smooth and clean surface. The matrix is highly resistant to acids, bases, lye and other corrosive media. Repairing and hard facing ferritic and austenitic steel tools and machine parts (steel casting). Specially developed for semi and fully automatic welding on tool joints and stabilizers in the petroleum industry.			
NIFD Plus	DIN EN 14700 T Ni20 DIN 8555 MF21-55-CGZ	Ni-Matrix with 50-63% SFTC	SFTC: 3,000 HV Matrix: 450-480 HV
NIFD is a flux cored wire filled with spherical tungsten carbide and NiCrBSi- matrix for semi-automatic welding application. The SFTC show a fine acicular structure with a higher hardness than FTC. NIFD was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. While having similar properties as NIFD, NIFD Plus can be applied in many NIFD applications when even superior wear protection through spherical SFTC is needed.			
Ni2	DIN EN 14700 T Ni20 DIN 8555 MF21-55-CGZ	Ni-Matrix with 50-62% FTC and special carbides	FTC: approx. 2,360 HV Other carbides: 2,900 HV Matrix: 450-480 HV
NI2 is a flux cored wire filled with a combination of very hard carbides together with fused tungsten carbide and NiCrBSi- matrix for semi-automatic welding application. NI2 was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. The alloy has a low melting range of between 900 – 1050°C (1,652 – 1,922°F) and feature a self fluxing characteristic producing a smooth and clean surface. The matrix is highly resistant to acids, bases, lye and other corrosive media. While having similar properties as NIFD, NI2 can be applied in many NIFD applications when extra matrix protection is needed. This is the case with parts prone to aggressive erosion attack with direct particle impact.			
FD 771	DIN EN 14700 T Ni20 DIN 8555 MF21-55-CGZ	Ni-Matrix with 45% FTC	FTC: 2,360 HV Matrix: 450-480 HV
FD 771 is a flux cored wire filled with fused tungsten carbide and NiCrBSi- matrix for semi-automatic welding application. It was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. The deposit alloy consists of approximately 45% FTC and a Ni-Cr-B-Si-matrix. The alloy has a low melting range of between 900 – 1050°C (1,652 – 1,922°F) and feature a self fluxing characteristic producing a smooth and clean surface. The matrix is highly resistant to acids, bases, lye and other corrosive media. Repairing and hard facing ferritic and austenitic steel tools and machine parts (steel casting). Specially developed for semi and fully automatic welding on tool joints and stabilizers in the petroleum industry.			
FD 779	DIN EN 14700 T Ni20 DIN 8555 MF21-55-CGZ	Ni-Matrix with 50-65% MCWC	MCWC: >1700 HV Weld metal: 490-540 HV
FD 779 is a flux cored wire with MCWC. It was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. The deposit alloy consists of approx. 50 - 65 % MCWC and an austenitic Ni-matrix. The alloy has a low melting range of between 900 – 1050°C (1,652 – 1,922°F) and feature a self fluxing charac teristic producing a smooth and clean surface.The alloy has a much lower melting point than commonly used iron based Flux Cored Wires with MC tungsten carbide filling and feature self fluxing characteristic producing a smooth and clean surface. The matrix shows a good resistance to corrosive media.			
OA	DIN EN 14700 T Fe20 DIN 8555 MF21-65-CG	Fe-Matrix with 50-62% FTC	FTC: 2,360 HV Weld metal: 1st layer 63-66 HRC 2nd layer 66-68 HRC
OA is an open arc iron-based tubular wire filled with fused tungsten carbide for semi-automatic application, where extreme abrasive wear is anticipated. For hard facing low alloyed steels that have a maximum of 0.45% carbon. Higher carbon content could lead to cracking. Also for hard facing and repairing tools and machine parts that are exposed to wear in mining, excavation, earth moving, tunneling shields, road construction, well drilling and deep drilling applications.			
OAM	DIN EN 14700 T Fe20 DIN 8555 MF21-65-CG	Fe-Matrix with 50-60% MCWC	MCWC: >1700 HV Weld metal: 63-66 HRC
OAM is an open arc iron-based tubular wire filled with macro chrystalline tungsten carbide for semi-automatic application, where extreme abrasive wear is anticipated. For hard facing low alloyed steels that have a maximum of 0.45% carbon. Higher carbon content could lead to cracking. Also for hard facing and repairing tools and machine parts that are exposed to wear in mining, excavation, earth moving, tunneling shields, road construction, well drilling and deep drilling applications.			



TUNGSTEN CARBIDES

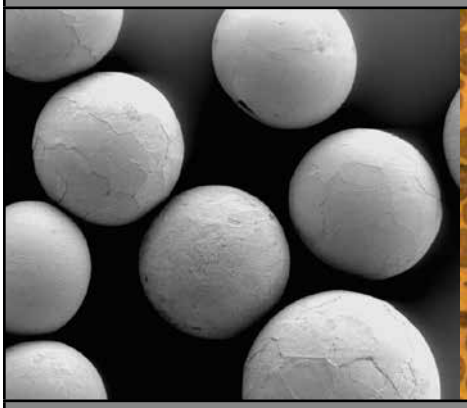
FUSED TUNGSTEN CARBIDES (FTC)

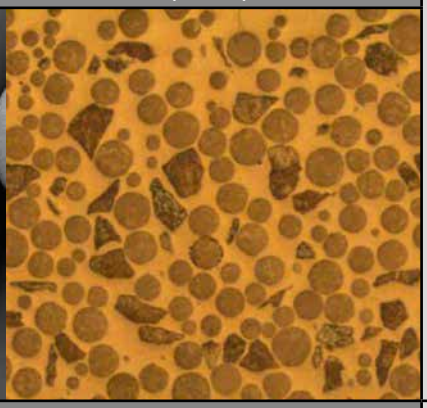




Fused and crushed tungsten carbides is extremely hard, wear resistant material. Its abrasion resistance is superior in terms of wear resistance to all other commercially available materials except diamond. The carbides are approximatly 2,360 HV and has a feather structure. The carbides can withstand heat up to 1800°C. Excessive heating however can dissolve the carbides in the matrix and this removes some of the resistance. Therefor the process used should always be as cold as possible.
These are also the most common tungsten carbides and used in a variety of applications like diamond tools, saw blades, dies, cutting tools, core bits, drill bits and other oil and mining applications.

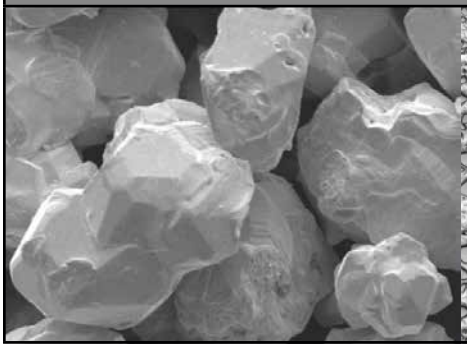
SPHERICAL TUNGSTEN CARBIDES (SFTC)

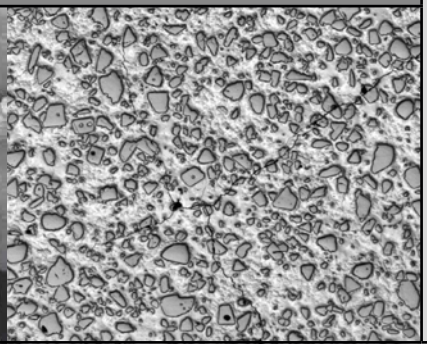




Spherical tungsten carbides are the most wear resistant carbides. These were developed to protect surfaces against extreme abrasive wear.
The hardness exceeds 3,000 HV and the carbides are less sensitive to cracking from impact wear than other carbides. Gives a more even surface than the other carbides and used where an even superior protection is required. Excellent for drilling tools, drill bits, crusher jaws, mixers, hot-pressed tools, extrusion housings etc.

MACRO-CHRYSTALLINE TUNGSTEN CARBIDES (MCWC)





Macro-Chrystalline tungsten carbides have a higher thermal stability and this will lead to less dissolution after welding and applications involving higher heat input. A high density carburized powder with higher carbon content than the other carbides.
This makes them also a bit more brittle than above carbides and can more easily crack when exposed to impact. They have a hardness of 1,700-2000 HV and carbides can stay in service up to 500°C. Used for excavation, earth moving and deep drilling applications. Used for diamond tools, drill bits etc.

NICKEL BASE CORED WIRES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)													
		C	SI	MN	CR	NI	MO	AL	V	W	NB	TI	CO	FE	HARDNESS
520W	DIN 8555 MF 23-40-CKPTZ DIN EN 14700 T Ni2-40-CKPTZ	0,05	-	-	19	Rest	6	2	0,3	5	-	3	10	-	As welded: 32-35 HRC After W-H: 45 HRC
521W deposits a CrCoMoTiAlW-alloyed nickel based weld metal. It is designed for gas shielded welding with pure Argon. The weld metal is a precipitation hardenable alloy with an exceptional combination of high temperature mechanical property, forgeability and corrosion resistance. To obtain a crack free deposit, the work piece should be pre-heated to a temperature of about 350 C (662°F). Slow cooling after welding is advised. Critical high temperature applications like hot forging dies or hot shear blades.															
521W	DIN 8555 MF 23-40-CKPTZ DIN EN 14700 T Ni2-40-CKPTZ	0,06	0,8	0,5	20	Rest	6	2	-	0,8	-	3	11	3,0	As welded: 32-35 HRC After W-H: 45 HRC
521W deposits a CrCoMoTiAlW-alloyed nickel based weld metal. It is designed for gas shielded welding with pure Argon. The weld metal is a precipitation hardenable alloy with an exceptional combination of high temperature mechanical property, forgeability and corrosion resistance. To obtain a crack free deposit, the work piece should be pre-heated to a temperature of about 350 C (662°F). Slow cooling after welding is advised. Critical high temperature applications like hot forging dies or hot shear blades.															
Co	DIN EN 14700 T Ni2-250-CKNPT W.N 2.4887	0,08	-	-	16	Rest	16	-	0,3	4,5	-	-	2,5	<5	As welded: 260-280 HB After W-H: 420 HB
Co can be applied by shielded arc welding, resulting in a heat and wear resistant hard facing. This deposit is resistant to oxidation, reduction and other corrosive media. When first applied to hot forging dies, the overlay is very cohesive. Exposed to impact and pressure load and even at elevated temperature, the resulting hard facing deposit increases in hardness up to 400 HB without deforming. For hardfacing on forging dies hot shear blades, lime kiln burner parts, dies, swages, press tools, hot-piercing punches, rolling and wire-drawing guides, pumps and valves for the chemical and petrochemical industries.															
625	ISO 18274: S-Ni 6082 (NiCr20Mn3Nb) AWS A5.14: ER NiCrFe-3	0,02	0,4	0,02	22	Rest	8,8	-	-	-	3,4	-	-	<1	
Flux cored nickel base wire for gas shielded arc welding. Designed for all-position operability. Used for high temperature strength and structural stability, resistance to general corrosion, pitting, crevice and stress corrosion cracking in severe chloride media. For welding of alloy 625, alloy 825, alloy 25-6MO, and a wide range of high alloy austenitic and super austenitic stainless steels. It is also used for surfacing of steel, for welding 9% Ni steels, and for welding various corrosion-resistant alloys.															
SE 1/58	DIN 8555 MF 22-60-CGTZ DIN EN 14700 T Ni1-60CGTZ	0,75	4,7	-	20	Rest	-	-	-	-	-	-	-	<5 +B: 3,2	58-62 HRC
Nickel base alloy deposit with properties like the cobalt alloy counterpart Co1 with good hardness, heat resistance, temperature shock resistance, corrosion and wear resistance. Chemical, automotive and food industry along with nuclear technology.															
SE 6/40	DIN 8555 MF 22-40-CGTZ DIN EN 14700 T Ni1-40CGTZ	0,4	4,5	-	22	Rest	-	-	-	2	-	-	-	<5 +B: 1,4	41-43 HRC
Nickel base alloy deposit with properties like the cobalt alloy counterpart Co6 with good hardness, heat resistance, temperature shock resistance, corrosion and wear resistance. Chemical, automotive and food industry along with nuclear technology.															
SE 12/50	DIN 8555 MF 22-50-CGTZ DIN EN 14700 T Ni1-50ZGTC	0,6	4,9	-	21	Rest	2,5	-	-	-	-	-	-	<5 +B: 2,8	48-52 HRC
Nickel base alloy deposit with properties like the cobalt alloy counterpart Co12 with good hardness, heat resistance, temperature shock resistance, corrosion and wear resistance. Chemical, automotive and food industry along with nuclear technology.															
SE 21/35	DIN 8555 MF 22-35-CGTZ DIN EN 14700 T Ni1-35CGTZ	0,35	4,5	-	20	Rest	-	-	-	2	-	-	-	<4 +B: 0,7	34-36 HRC
Nickel base alloy deposit with properties like the cobalt alloy counterpart Co21 with good hardness, heat resistance, temperature shock resistance, corrosion and wear resistance. Chemical, automotive and food industry along with nuclear technology.															
SE 56	DIN 8555 MF 22-55-CGTZ DIN EN 14700 T Ni1-55CGTZ	0,65	4,6	0,2	21	Rest	2,5	-	-	-	-	-	-	- +B: 2,9	55-58 HRC
High hot hardness, corrosion resistance, heat resistance, wear resistance and thermal shock constancy. Oil press screws, chemical industry.															

CAST IRON CORED WIRES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)												
		C	SI	MN	CR	NI	MO	TI	V	W	NB	CO	FE	HARDNESS
116 MCW	EN ISO 1071: T C Z NiFe-1 M	0,5	0,5	2,5	-	60	-	-	-	-	-	-	Rest	180-200 HB
Ferro-nickel alloyed filler metal for welding and repairing of grey, malleable, nodular and phosphorus cast iron. Good flow of the weld metal and excellent welding caracteristics. Welding of highly restrained or thick walled pieces· Preheat is not necessary. Heat input is low which favours limited heat affected zone. Foundry defects, repair on engine blocks, gearboxes, valve bodies, pump bodies, crushers etc.														
114 MCW	EN ISO 1071: T C NiFeT3-CI M21	0,6	0,6	4	-	45	-	-	-	-	-	-	Rest	160-200 HB
Ferro-nickel alloyed filler metal for welding and repairing of grey, malleable, nodular and phosphorus cast iron. Good flow of the weld metal and excellent welding caracteristics. Welding of highly restrained or thick walled pieces· Preheat is not necessary. Heat input is low which favours limited heat affected zone. Foundry defects, repair on engine blocks, gearboxes, valve bodies, pump bodies etc.														

COPPER ALLOYS CORED WIRES

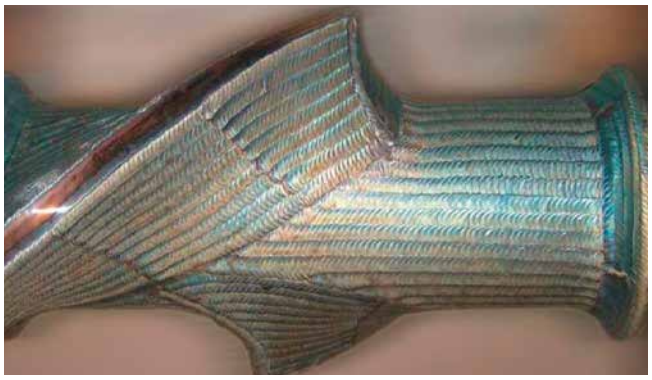
PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)								
		CU	AL	SN	MN	NI	P	FE	TI	HARDNESS
CuAl12Ni5	EN 14700: T Cu1	Rest	11,5	-	1	4,8	-	2	-	320 HB
Special cored wire for GMAW. The weld metal is a Cu – Mn –Ni – Al bronze. Sound, pore free deposits on ferrous and non-ferrous base materials. Building up of aluminium bronze alloys and cladding components undergoing metal to metal wear under high pressure. Especially suited for marine environments. The addition of nickel improves corrosion resistance in heat and rough seawater. Excellent resistance to cavitation and stress corrosion cracking. Ship propellers, shafts, guide grooves etc										

TOOL STEEL CORED WIRES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)												
		C	SI	MN	CR	NI	MO	V	W	NB	TI	CO	FE	HARDNESS
WZ 50	DIN 8555 MF 3-50-ST DIN EN 14700 T Fe3-50-STW	0,3	0,6	0,4	3	-	-	0,6	4,5	-	-	-	Rest	As welded: 48-50 HRC After H-T: 50-52 HRC
This C-Cr-V-W-alloyed flux cored wire is suitable for repair and build up applications on hot working steels of similar or lower alloyed hot working tools. Machinable. A heat treatment is possible and has retention of hardness up to 550°C.Slab shears, hot-forging dies, hot shear blades, drawing dies, crushing equipment and depressions created by forging, pressure and impact stress.														
WZ 55	DIN 8555 MF 3-55-ST DIN EN 14700 T Fe3-50-STW	0,35	0,8	1,2	3	-	-	0,5	7	-	-	2	Rest	As welded: 53-56 HRC After H-T: 57-59 HRC
WZ 55 is a cored wire which deposits an air hardening and wear resistant alloy and can be applied to reclaim hot-forging dies and to overlay the edges and flat areas of low alloyed high density steel tools. Slab shears, hot-forging dies, hot shear blades drawing dies, containers, crushing equipment and depressions created by forging, pressure and impact stress.														
WZ 57	DIN 8555 MF 4-55-ST DIN EN 14700 T Fe4-55-STW	0,35	0,8	0,8	13	-	2,2	0,25	5,5	-	-	10	Rest	As welded: 50-53 HRC After H-T: 57-59 HRC
WZ 57 is a cored wire which deposits an air hardening and wear resistant alloy and can be applied to reclaim hot-forging dies and to overlay the edges and flat areas of low alloyed high density steel tools. Slab shears, hot-forging dies, hot shear blades drawing dies, containers, crushing equipment and depressions created by forging, pressure and impact stress.														
WZ 59	DIN 8555 MF 4-55-ST DIN EN 14700 T Fe4-55-ST	0,6	0,6	-	5	-	3,5	-	3,5	-	-	-	Rest	57-59 HRC
The wear and heat resistant deposit of this flux-cored wire electrode in high speed steel quality is suitable for repair and manufacture of hot and cold working tools, stamps and counter dies. etc. The weld deposit can be heat treated and has a retention of hardness up to 550 °C. High speed steel tools, pinion-type cutters, chisels														
WZ 60	DIN 8555 MF 4-60-ST DIN EN 14700 T Fe4-60-ST	0,8	0,6	0,4	4,5	-	8	1,5	2	-	-	-	Rest	58-60 HRC After air cooling
WZ 60 is a cored wire which deposits an air hardening and wear resistant alloy and can be applied as a high-temperature wear resistant hardfacing on low alloyed high desity steel tools. New and repair hardfacing on plungers dies, forging dies, press mandrils.														
WZ 6356	DIN 8555 MF 4-55-ST DIN EN 14700 T Fe3-60-ST	0,03	-	-	-	18	4	-	-	-	-	12	Rest Ti+	As welded: 41-43 HRC After H-T: 53-56 HRC
The weld deposit consists of a martensitic hardening, high strenght steel, which can be machined after welding. By hot hardening a significant increase in the hardness of the weld metal is reached, another is possible by nitration. Al-diecasting mold, Al-edge tools and shearing tools.														

COBALT BASE CORED WIRES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)											
		C	SI	MN	CR	NI	MO	AL	V	W	CO	FE	HARDNESS
Co1	EN 14700 T Co3 AWS A5.21 ERCCoCr-C	2,3	1	1	29	-	-	-	-	12	rest	4	20°C 55 HRC 600°C 44 HRC 800°C 34 HRC
Hardest deposit of all standard cobalt alloys, excellent resistance to corrosion, reducing acids, impact, extreme wear and tempearture shocks. Retains hardness at temperatures over 760°C. Pump sleaves, transport screws, wear pads													
Co6	DIN 8555 MSG20-GF-40-CTZ EN 14700 T Co2 AWS A5.21 ERCCoCr-A	1,1	1	1	29	-	-	-	-	4,5	rest	4	20°C 40-43 HRC 300°C 35 HRC 600°C 29 HRC
Mostly flexible and widely used alloy due to overall performance. Retains hardness at temperatures up to 500°C. Steam and chemical valves, shear blades, pumps for high temperature liquids, paper and pulp applications.													
Co6 LC	DIN 8555 MSG20-GF-40-CTZ EN 14700 T Co2 AWS A5.21 ERCCoCr-A	0,9	1	1	29	-	-	-	-	4,5	rest	4	20°C 36-39 HRC 300°C 35 HRC 600°C 29 HRC
Mostly flexible and widely used alloy due to overall performance. Retains hardness at temperatures up to 500°C. Steam and chemical valves, shear blades, pumps for high temperature liquids, paper and pulp applications. LC stands for lower carbon content.													
Co6 HC	DIN 8555 MSG20-GF-40-CTZ EN 14700 T Co2 AWS A5.21 ERCCoCr-A	1,3	1	1	29	-	-	-	-	4,5	rest	4	20°C 42-46 HRC 300°C 35 HRC 600°C 29 HRC
Mostly flexible and widely used alloy due to overall performance. Retains hardness at temperatures up to 500°C. Steam and chemical valves, shear blades, pumps for high temperature liquids, paper and pulp applications. HC stands for lower carbon content.													
Co12	EN 14700 T Co2 AWS A5.21 ERCoCr-B	1,6	1	1,5	29	-	-	-	-	8,0	rest	3	20°C 45-47 HRC 300°C 37 HRC 600°C 32 HRC
High resistance to corrosion and galling at elevated temperatures. Retains hardness up to 700°C. Common in the wood industry for large band saw blades, chain saw bars etc.													
Co21	EN 14700 T Co1 AWS A5.21 ERCCoCr-E	0,25	1	1	28,5	3	5,5	-	-	-	rest	4	30 HRC work hardening 45 HRC
High corrosion and thermal resistance. The alloy is machinable. Steam valves, hot shears, chemical and petrochemical valves, forging dies etc.													
Co25	EN 14700 T Co1 DIN 8555 MSG20-GF-250-CPTZ	0,15	1	1,5	20	10	-	-	-	14	rest	4	250-280 HB
Exceptional thermal fatigue resistance and useful for tools to work hot steel. The alloy also resists hot metal on metal wear. The deposited weld metal with has an excellent strength, good oxidation resistance up to 980°C, very good sulfidation resistance, and relatively good resistance to wear and galling.													
Co190	-	3,2	1,0	0,3	25	<3	-	-	-	13	Rest	<4,5	52-60 HRC
Co190 is similar to Co1 but slightly harder. It has a large volume of chromium carbides in a cobalt matrix, giving the alloy excellent resistance to abrasion and solid particle erosion. It can be machined with difficulty using carbide tools or ground. It bonds well with stainless and other weldable alloy steels. Used for drilling tools, drill bits and other mining applications.													



WORK HARDENING ELECTRODES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)												
		C	SI	MN	CR	NI	MO	TI	V	W	NB	CO	FE	HARDNESS
307 E	ISO 3581-A : E 18 8 Mn R 73 X AWS A 5.4: E307-26	0,1	0,8	5	18	8,5	-	-	-	-	-	-	Rest	As welded: 200 HB After W-H: 500 HB
Rutile-basic electrode with high recovery (160%). Fully austenitic stainless steel deposit with a high Mn-content. For welding and cladding on Mn-steels (14% Mn), for dissimilar joints and difficult to weld materials, buffer layers prior hardfacing, repairing of pieces submitted to shocks. Easy to use, soft fusion, low spatters, easy slag removal, deposit highly resistant to cracks. Repair of: manganese steel buckets and shovels, high tensile tools and dies, clutches, crane wheels, earthmoving undercarriage parts, gear wheels, etc.														
HMn E	DIN EN 14700: E Fe9 DIN 8555: E7-UM-250-KP AWS A5.13 EFeMn-A	0,9	0,6	13	3	3,5	-	-	-	-	-	-	Rest	As welded: 200 HB After W-H: 400-500 HB
Rutile-basic coated electrode, suitable to surface all pieces subject to high impact. Sometimes used instead of 307 E for 13% Mn-steel assembling (Hadfield steels). Frequently used as buffer layer before hardfacing in case of heavy reclaiming before applying abrasion resistant final layers. The deposit is austenitic and the addition of Ni and Cr increases the resistance against cracks and abrasion. Repairing of used parts or preventive protection of new parts in railway applications (rails, switches, crossings, tongues) in quarries and mines (crusher jaws, excavator and grab teeth, mill hammers, rock crusher).														
HMnCr E	DIN EN 14700: E Fe9 DIN 8555: E7-UM-250-KPR AWS A5.13 EFeMnCr	0,6	0,3	16	14	-	-	-	-	-	-	-	Rest	As welded: 260 HB After W-H: 400-500 HB
Synthetic-basic coated electrode with high recovery (140%), suitable to surface all pieces subject to high impact and cavitation in combination with corrosion. Also used for dissimilar joints between Mn- and construction steels and as a buffer layer before hardfacing. The high amount of Cr increases the resistance against corrosion, abrasion and cavitation. Repairing of used parts or preventive protection of new parts in railway applications (rails, switches, crossings, tongues) in quarries and mines (crusher jaws, excavator and grab teeth, mill hammers, rock crusher).														
312 E	ISO 3581: E 29 9 R 32 AWS A 5.4: E312-16	0,1	1	0,6	29	9	0,5	-	-	-	-	-	Rest	As welded: 240 HB After W-H: 450 HB
Rutile-basic coated electrode with high alloy content and high ferrite ratio which allow it to benefit from extreme tolerance to hot cracking and to dilution with a wide range of base materials. Preheat can often be avoided or minimized. The weld deposit workhardens and gives good wear and friction resistance. Examples: Welding stainless steels of similar composition or ferritic stainless steels. Joining stainless steels to mild and low-alloyed steels. Buffer layers before hardsurfacing. Maintenance on hard-to-weld steels. Welding high carbon hardenable steels, of known or unknown composition and generally most of steels subject to cracking such as tool steels, manganese steels, spring steels and high-speed steels.													

IMPACT RESISTANT ELECTRODES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)												
		C	SI	MN	CR	NI	MO	TI	V	W	NB	CO	FE	HARDNESS
7130 E	DIN EN 14700: E Fe1 DIN 8555 E1-UM-300	0,1	0,8	0,5	3,4	-	-	-	-	-	-	-	Rest	28-33 HRC
Meltolit 7130 E is used for surfacing and rebuilding parts subjected to high impact and high compressive stresses. Track pads and rollers, moulds, dies, gear teeth, mill roll coupling shaft ends, rail tracks etc.														
7100 E	DIN EN 14700: E Fe1 DIN 8555 E1-UM-400	0,3	0,5	1	1,5	-	-	-	-	-	-	-	Rest	35-42 HRC
Rutile coated electrode for surfacing of machine and construction parts, as well as of tools made of low alloyed and cast steels which are mainly stressed by pressure and shock. Electrodes are easy to weld even on small welding equipment with low open arc voltage. Surfacing of rollers, gear teeth, stamps, hammers, guide rails etc.														
7135 E	DIN EN 14700: E Fe3 DIN 8555 E3-UM-40-PT	0,15	0,5	0,7	6,5	-	3,5	-	-	-	-	-	Rest	38-42 HRC
Rutile coated electrode for surfacing of machine and construction parts, as well as of tools made of low alloyed and cast steels which are mainly stressed by pressure ,shock and wear at elevated temperatures up to 550°C. Dies, Rollers, hot shear blades etc.														
7140 E	DIN EN 14700: E Fe3 DIN 8555 E3-UM-50-T	0,3	0,5	0,6	5,2	-	4	-	-	-	-	-	Rest	45-50 HRC
Meltolit 7140 E is used for surfacing and rebuilding parts subjected to impact and high compressive stresses. The weld deposit distinguishes itself by its toughness and heat resistance. Therefore the electrode is used for overlay and builds up of machine parts and tools subject to impact, compression and wear used at operating temperatures up to 550° C. It is widely used for building up hammers, dies, swages, hot shear blades, rollers, etc														
7160 E	DIN EN 14700: E Fe2 DIN 8555 E10-UM-60	1,0	0,5	1,3	4,5	-	-	-	-	-	-	-	Rest	55-60 HRC
7160 is a rutile-basic electrode used for hardsurfacing components that is subject to impact, pressure and shocks. Bucket teeth, bucket lips, bulldozer blades, crusher jaws, scraper blades, chutes, pump housings, conveyor screws, slide plates, gear teeth, crusher hammers, drilling bits, ploughshares, reamers etc.														
7110 E	DIN EN 14700: E Fe8 DIN 8555 E6-UM-60-S	0,4	1	1	9	-	1	-	1	-	-	-	Rest	58 HRC
Rutile-basic coated general purpose hardfacing electrode for applications subject to impact, compression and abrasive wear. For hardfacing on components made of C-steel, cast steel and Manganese steel. The deposit is tough-hard and crack resistant. Recovery of the electrode approx. 120%. Hardfacing of block presses, crusher jaws, wheel rims, rollers, caterpillar tracks, ploughshares, running surfaces, cutting edges etc														
7150 E	DIN EN 14700: E Fe4 DIN 8555 E1-UM-60-ST	0,8	0,5	0,5	5	-	10	-	1,5	1,5	-	-	Rest	60-63 HRC
Rutile-basic coated electrode destined to surface all kinds of cutting tools such as lathe and plane tools. The sharpness obtained has an exceptional quality. C-Cr-Mo-W martensitic deposit, resistant up to 500°C. This electrode is also used for surfacing of pieces subject to metal/metal wear. Withstands moderate shock. In the as welded condition only machinable by grinding. Hardfacing of machining tools, cutting tools made of steel, punches, drills, shear blades.														
7150Co E	DIN EN 14700: E Z Fe3 DIN 8555: E3-UM-50-CRTZ	0,15	0,6	0,6	14	-	2,3	-	-	-	-	13	Rest	As welded: 45-50 HRC After W-H: 55 HRC
Rutile-basic coated electrode resistsant to metal against metal wear, corrosion and high temperatures. Used for overlay and builds up of machine parts and tools subject to impact, compression and wear at operating temperatures up to 650° C. The deposit is resistant to thermal shock and can be machined with tungsten carbide tipped tools. Dies, hot working tools, moulds, continuous driving rolls, mandrels, forming tools etc														
WZ 50 AC	EN 14700 : E Z Fe3 DIN 8555: E 3-UM-50-T	0,3	-	-	2,2	-	-	-	0,6	4,2	-	-	Rest	As welded: 47 HRC After H-T: 48-52 HRC
AC-weldable high-quality electrode with approx. 120 % recovery. Used for repairing steels of same type, e.g. on hot working tools, and for overlaying edges or surfaces of tools made of low alloyed high density steels. Slab shears, hot shear blades, drawing blocks, hotforging dies, impact moulding dies, containers, swages etc.														
WZ 60 AC	DIN 8555: E 4-UM-60-ST W.N 1.3346	0,9	-	-	4,5	-	8,5	-	1,5	2	-	-	Rest	59-62 HRC
AC-weldable high-quality electrode used for rebuilding on high speed tool steels. Examples are cutting, piercing and shaving tools, hot working punshes and dies, extrusion moulds and dies, shear blades, milling and cutting tools, swaging hammers, wood cutting tools and cutting edges on stamping dies.														

ABRASION RESISTANT ELECTRODES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%) C	SI	MN	CR	NI	MO	TI	V	W	NB	CO	FE	HARDNESS
71160 E	DIN EN 14700 Fe14 DIN 8555 E10-UM-60-GRPZ	3,3	1,0	0,5	29	-	-	-	-	-	-	-	Rest	58-60 HRC
Synthetic rutile coated hardfacing electrode with high recovery (160%). For applications subject to abrasive wear by minerals, combined with medium impact and compression. Austenitic matrix containing Cr-carbides. The deposit resists to corrosion due to the high chromium content as well as heat up to 200°C. Easy flow, smoth bead surface, self releasing slag. Surfacing in 1 - 2 or eventual 3 layers for all pieces subject to high abrasion combined with a good resistance to shocks. Only machinable by grinding. For excavating and crashing equipment, surfacing of endless screws, mixer blades, pump bodies for abrasive materials, excavator teeth, crashing installations for minerals, concrete pumps, ore crushing, plough shares, lumps break, screw presses for bricks.														
600 HRT	DIN EN 14700 Fe15	5	-	0,5	35	-	-	-	-	-	-	-	Rest	58-62 HRC
Tubular electrode filled with chromium carbide powder. Deposit highly resistant to abrasion and mineral erosion. High amount of Cr carbides in an austenitic matrix, very compact. To consume with very low current. Agreeable melting. No slag. Deposit not machinable. Possibility to increase deposition by introducing a second electrode in the arc (double the recommended current). For agriculture, cement industries, quarries, brickyards, civil engineering, screws of brick press, excavators.														
71180 E	DIN EN 14700 Fe15 DIN 8555 E10-UM-65-GR	5	1,5	-	24	-	-	-	-	-	7	-	Rest	64 HRC
71180 E is an electrode for hardfacing especially for extreme abrasive wear. The deposit has a ledeburitic structure with different very hard types of carbide. It is used where ever abrasive wear is extremely high because it offers an excellent resistance against abrasion. The electrode is easy to weld, has a smooth drop transfer and only negligible slag content. Recovery approx. 190%. The resulting deposits cannot be heat treated, machined or forged. Ash plows, coke crusher segments, screw conveyers, valves, exhaust fans, agitator fingers, mill guides, mixer paddles, rake teeth in furnaces, tong bits, slag ladles, elevator bucket-tips etc at operation temperatures up to 450°C.														
7180 E	DIN EN 14700 Fe16 DIN 8555 E10-UM-65-GRZ	5	1,5	-	22	-	7	-	1	2	7	-	Rest	65 HRC
7180 E is a used especially with extreme abrasive wear even at elevated temperatures. The deposit has a ledeburitic structure with many different very hard types of carbides. 7180 E is used where extreme abrasive wear is expected even at elevated temperatures up to 600°C. Weldability is excellent, has a smooth drop transfer and only negligible slag content Recovery approx. 200%. The resulting deposits cannot be heat treated, machined or forged. Ash plows, coke crusher segments, screw conveyers, valves, exhaust fans, agitator fingers, mill guides, mixer paddles, rake teeth in furnaces, tong bits, slag ladles, elevator bucket-tips etc.														

TUNGSTEN CARBIDES ELECTRODES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)	HARDNESS
DURMAT E	DIN EN 14700 E Fe20 DIN 8555 E21-GF-UM-60-CG	Fe-based with FTC Tube 3,5-8,0mm	FTC: 2,360 HV Weld metal: 55-58 HRC
Tube electrode filled with medium sized fused tungsten carbides developed for manual welding application. This electrode can be applied by alternating or direct current trouble free once the proper machine setting is obtained. For hard facing on machine parts of unalloyed or low alloyed steel with carbon content up to 0.5%. Higher carbon content could lead to cracking. For hard facing and repairing tools and machine parts exposed to wear in mining, road construction, ceramic, petroleum, excavation and dredging applications.			
DURMAT NISE	DIN EN 14700 E Ni20 DIN 8555 E21-GF-UM-60-CGZ	Ni-matrix with FTC Rod 4,0-8,0mm	FTC: approx. 2,360 HV NiCrBSi-alloy: 480-520 HV
NISE is a tubular electrode filled with fused tungsten carbide and a special nickel alloy for manual welding. This alloy is specially designed for application where extreme abrasion in combination with corrosion is expected. NISE can be applied on steel castings, nickel based and stainless steel alloys. The alloy combination of DURMAT NISE is specially designed for surfaces that are exposed to corrosive media and excessive wear conditions. The matrix is highly resistant to acids, lye's and other corrosive media. Repairing and hard facing ferritic and austenitic steels (steel castings), stabilizer blades, conveyor screws, milling plates, deep drilling tools, and mixer blades.			

COBALT BASE ELECTRODES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%) C	SI	MN	CR	NI	MO	AL	V	W	CO	FE	HARDNESS
Co1 E	EN 14700 T Co3 AWS A5.21 ERCCoCr-C	2,3	1	1	29	-	-	-	-	12	rest	4	20°C 55 HRC 600°C 44 HRC 800°C 34 HRC
Hardest deposit of all standard cobalt alloys, excellent resistance to corrosion, reducing acids, impact, extreme wear and tempearture shocks. Retains hardness at temperatures over 760°C. Pump sleaves, transport screws, wear pads													
Co6 E	DIN 8555 E20-UM-45-CRTZ EN 14700 T Co2 AWS A5.21 ERCCoCr-A	1,1	1	1	29	-	-	-	-	4,5	rest	4	20°C 40-43 HRC 300°C 35 HRC 600°C 29 HRC
Mostly flexible and widely used alloy due to overall performance. Retains hardness at temperatures up to 500°C. Steam and chemical valves, shear blades, pumps for high temperature liquids, paper and pulp applications.													
Co6 HR	DIN 8555 E20-UM-45-CRTZ EN 14700 T Co2 AWS A5.21 ERCCoCr-A	0,9	1	1	29	-	-	-	-	4,5	rest	4	20°C 40-43 HRC 300°C 35 HRC 600°C 29 HRC
High recovery electrode (160%). Mostly flexible and widely used alloy due to overall performance. Retains hardness at temperatures up to 500°C. Steam and chemical valves, shear blades, pumps for high temperature liquids, paper and pulp applications.													
Co12 E	EN 14700 T Co2 AWS A5.21 ERCoCr-B	1,6	1	1,5	29	-	-	-	-	8,0	rest	3	20°C 45-47 HRC 300°C 37 HRC 600°C 32 HRC
High resistance to corrosion and galling at elevated temperatures. Retains hardness up to 700°C. Common in the wood industry for large band saw blades, chain saw bars etc.													
Co21 E	EN 14700 T Co1 AWS A5.21 ERCCoCr-E	0,25	1	1	28,5	3	5,5	-	-	-	rest	4	As welded: 30 HRC After W-H: 45 HRC
High corrosion and thermal resistance. The alloy is machinable. Steam valves, hot shears, chemical and petrochemical valves, forging dies etc.													
Co21 HR	EN 14700 T Co1 AWS A5.21 ERCCoCr-E	0,25	1	1	28,5	3	5,5	-	-	-	rest	4	As welded: 30 HRC After W-H: 45 HRC
High corrosion and thermal resistance. The alloy is machinable. Steam valves, hot shears, chemical and petrochemical valves, forging dies etc. High recovery electrode.													
Co25 E	EN 14700 T Co1 DIN 8555 E20-UM-250-CKTZ	0,15	1	1,5	20	10	-	-	-	14	rest	4	250-280 HB
Exceptional thermal fatigue resistance and useful for tools to work hot steel. The alloy also resists hot metal on metal wear. The deposited weld meta has an excellent strength, good oxidation resistance up to 980°C, very good sulfidation resistance, and relatively good resistance to wear and galling.													

WEAR RESISTANCE

Alloy	Metal/metal sliding wear	Impact	Erosion	Corrosion	Abrasion(cold)	Abrasion(hot)
Co1	+++	-	+++	+++	+++	+++
Co6	+++	+++	+++	+++	++	++
Co12	+++	++	+++	+++	+++	+++
Co21	+++	+++	+++	+++	+	+
Co25	+++	+++	+++	+++	++	++

NICKEL BASE ALLOYS ELECTRODES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)													
		C	SI	MN	CR	NI	MO	AL	CO	W	NB	TI	CU	FE	HARDNESS
55 XE	AWS A 5.15: E NiFe-Cl ISO 1071: E C NiFe-1 3	1,1	1,2	0,8	-	53	-	-	-	-	-	-	4	Rest	200 HB
Ferro-nickel electrode with graphite-basic coating for welding and repairing of grey, malleable, nodular and phosphorus cast iron. Good flow of the weld metal and excellent welding caracteristics. Foundry defects, repair on engine blocks, gearboxes, valve bodies, pump bodies etc. Copper coated core wire to minimize heat input.															
61 XE	AWS A 5.15: E Ni-Cl ISO 1071: E C Ni-Cl 3	<1	<1,2	-	-	Rest	-	-	-	-	-	-	-	<2	180 HB
Weld deposit consists of pure nickel. Recommended for cold welding and repairing of grey cast iron, repairing of cracks. Good bonding and flow of the weld metal and can be used as buffer strings before using a NiFe wire. Repair of engine blocks, frames of tool machines, valve and pump bodies. Also used for surfacing of steel as it has good corrosion resistance, particularly in alkalies.															
60 XE	AWS A 5.11: ER NiCu-7 ISO 14172: E-Ni 4060 (NiCu30Mn3Ti)	0,03	0,7	3,2	-	Rest	-	-	-	-	-	0,5	29	1,2	-
Nickel and copper alloyed electrode for welding and hardfacing copper-nickel alloys and copper-nickel plated steels such as Monel 400, CuNi 90/10, CuNi 70/30 and CuNi30. Also for above grades against carbon steels.															
82 XE	AWS A 5.11: ER NiCrFe-3 ISO 14172: S-Ni 6182 (NiCr15Fe6Mn)	0,03	0,2	3,2	20,5	Rest	-	-	-	-	-	0,3	2,3	2	-
NiCr-alloyed electrode for welding of high nickel content alloys such as inconel 600 and Incoloy 800. Used for dissimilar joining of low alloyed steel, stainless steel, nickel steel and cast iron. Used in cryogenics, repair of difficult to weld steels and petro chemical applications.															
625 XE	AWS A 5.11: ER NiCrMo-3 ISO 14172: E-Ni 6625 (NiCr22Mo9Nb)	0,04	0,4	0,6	22	Rest	9	-	-	-	3,4	-	-	3	-
Used for high temperature strength and structural stability, resistance to general corrosion, pitting, crevice and stress corrosion cracking in severe chloride media. For welding of alloy 625, alloy 825, alloy 25-6MO, and a wide range of high alloy austenitic and super austenitic stainless steels. It is also used for surfacing of steel, for welding 9% Ni steels, and for welding various corrosion-resistant alloys such as alloy 20.															
C-276 XE	AWS A 5.11: ER NiCrMo-4 ISO 14172: E-Ni 6276 (NiCr15Mo15Fe6W4)	0,02	0,2	0,6	16,2	Rest	16	-	-	4	-	-	-	5	-
Nickel alloyed electrode for welding of high nickel content alloys such as Hastelloy C-276, NiMo16Cr15W. Excellent resistance to chlorides, acids and corrosion. Equipment for chemical industry and piping.															
59 XE	AWS A 5.11: ER NiCr-Mo-13 ISO 14172: E-Ni 6059 (NiCr23Mo16)	0,01	0,2	0,5	22,5	Rest	16,2	-	-	-	-	-	0,15	1,2	-
Nickel alloyed electrode for welding of Alloy 59, C-276, 625, Incoloy 800 and 825 or other nickel alloyed steels at lower temperature. Also used for joining of austenitic duplex and super-duplex steels. Often used in offshore industry, boilers, containers and pipe systems in chemical and petro -chemical industry.															
7170 E	DIN EN 14700: ENi2 AWS A5.11: ENiCrMo-5 DIN 8555: E23-UM-250-CKTZ	<0,1	0,5	0,8	16	Rest	16	-		4	-	-	-	5,5	250 HB After W-H: 400 HB
Rutile-basic special surfacing electrode with 170% recovery and a deposit composition of alloy C (Ni-Cr-Mo) with outstanding welding characteristics. Deposit is resistant to corrosion and all type of oxidation. Deposit work-hardens under impact and is machinable. Also used for parts subject to high thermal shocks. Surfacing of hot working tools, hot shear blades, deburring tools, swages, dies, press tools as well as pump parts, installations for chlorisation, valves and reservoirs.															
7170Co E	DIN EN 14700: E Ni2 AWS A5.11: ENiCrMo-5 DIN 8555: E23-UM-250-CKTZ	<0,1	0,5	0,8	16	Rest	16	-	3,5	4	-	-	-	3	250 HB After W-H: 400 HB
Special hardfacing electrode with 170% recovery and a deposit composition of alloy C (Ni-Cr-Mo) + Co. Used to surface parts exposed to compression, corrosion, heat up to 800°C and thermal shocks. Surfacing on hot working tools, shear blades, deburring tools, swages, forging saddles, forging anf hot trimming dies, press tools and pump parts. More hot resistant than 7170 E due to the cobalt addition.															

COPPER ALLOYS ELECTRODES

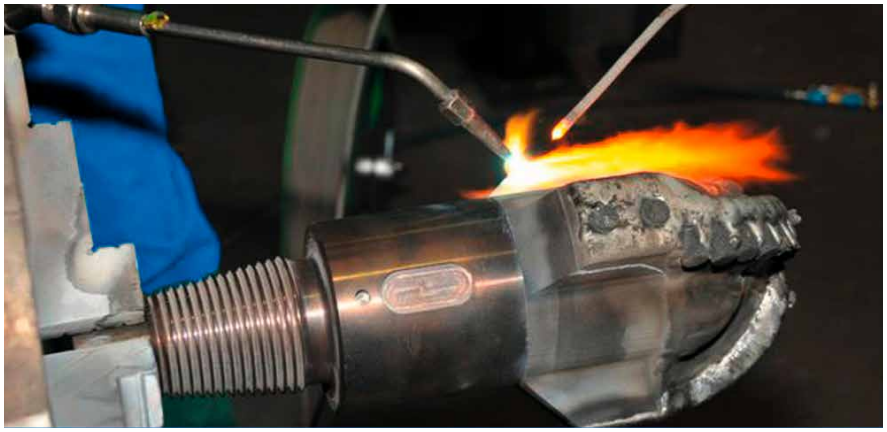
PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)								
		CU	AL	SN	MN	NI	P	FE	TI	HARDNESS
CuSn7	DIN 1733: EL-CuSn7 AWS A5.6: E CuSn-C	Rest	-	7	0,9	-	0,1	0,15	-	110 HB
Used for build-up and join welding on CuSn alloys, CuSnZnPb cast alloys and cast iron.										
CuSn12	DIN 1733: EL-CuSn12 AWS A5.6: E CuSn-A	Rest	-	12	0,9	-	0,1	0,15	- +Si 3	120 HB
Suitable for all welding processes. The weld metal achieves high hardness corresponding to a cast bronze, so it's used for particularly wear-resistant coatings as well as for join welding and repairs on bronzes.										
CuAl8	DIN 1733: EL-CuAl9 AWS A5.6: E Al-A2	Rest	8	-	1	-	-	0,7	-	180 HB
Suitable for welding and hardfacing aluminium bronzes, steel and galvanized steel. Very good corrosion and wear resistance. Preheating is recommended for large workpieces. Excellent weldability, stable arc and easy slag removal. Ship building, salt water applications, pumps, impellers.										
MX 300 (CuMn13Al)	DIN 1733: EL-CuMn14Al AWS A5.6: E CuMnNiAl	Rest	6	-	12	2,2	-	2,2	-	200 HB
MX 300 is a high-strength welding wire, also spark-proof. Resistant to seawater, wear, and abrasion. Resistant to cavitation and erosion. Buildup and join welding on aluminum bronzes. Especially for ship propellers, slide rails, raceways, valve control housings.										
CuNi30	DIN 1733: EL-CuNi30Mn AWS A5.6: E CCuNi	Rest	-	-	1,2	30	-	0,5	0,2	115 HB
CuNi30 is well suited for highly stressed, corrosion-resistant buildup welds on cast iron and on unalloyed and low-alloy steels, as well as seawater-resistant CuZn alloys. Well suited for welding on CuNi materials. Especially recommended in the area of plant construction.										

SPECIAL APPLICATION ELECTRODES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)											
		C	SI	MN	CR	NI	MO	NB	CU	RM (MPA)	RP 0,2 (MPA)	A5 (%)	IMPACT
2535 E	EN ISO 3581-A: EZ 25 35 Nb B 22	0,4	1	2	24,5	35	-	1,3	-	-	-	-	-
Basic coated electrode for joint welding and rebuilding of corrosion- and heat-resistant high alloyed steels and cast steels. The deposit is heat proof up to 1150°C and resistant to carbonising, oxidising and reducing gases. Petrochemical applications etc.													
2133 E	EN ISO 3581-A: EZ 22 33 Nb B 22 (alloy 800)	0,15	0,6	1,6	21	33	-	1,2	-	600	380	25	+20°C 45J
Basic coated electrode for joint welding corrosion- and heat-resistant high alloyed steels and cast steels. The deposit is heat proof up to 1050°C and resistant to carbonising, oxidising and reducing gases. Petrochemical applications etc.													
383 E	AWS A5.4: E383-16 ISO 3581-A: E 27 31 4 Cu L R 12	0,03	0,8	1,4	27	31	-	-	1	>580	>380	>35	+20°C >70J
Special stainless alloy for welding of Cu-alloyed stainless steels. resistance to pittiing and stress corrosion in acid and alkaline environments.													
385 E (904L)	AWS A5.4: E385-16 ISO 3581-A: E 20 25 5 Cu N L R 12	0,03	0,8	1,4	20,5	25	4,5	-	1,5	>570	>370	>35	+20°C >70J
Rutile-basic fully austenitic stainless electrode suitable for welding stainless steels of similar composition and for dissimilar welds between these steels and mild, low alloy and other stainless steels. Very good resistance to heat cracking, intercrystalline corrosion and acids. It is an alternative choice to overmatch leaner alloys such as 317LN, 1.4439 etc. Typical applications: Tanks, piping systems, vaults etc that need to withstand phosphorus, sulphates and other similar environments.													

TUNGSTEN CARBIDES OXY-ACETYLENE

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%)	HARDNESS
A (WC60)	DIN EN 14700 T Fe20 DIN 8555 G21-GF-55-CG	Fe-based with FTC Tube 3,5-8,0mm	FTC: 2,360 HV Weld metal: 55 HRC
Consists of a special pre-alloyed tube filled with coarsely grained Fused Tungsten Carbide (FTC) for oxyacetylene welding. The FTC has an exceptionally high hardness of over 2360 HV0.1 giving outstanding wear protection to hard faced areas. For special hard facing on machine parts of unalloyed, low alloyed or cast steel with carbon content up to 0.45%. Higher carbon content could lead to cracking. Depending on the size and composition of the area to be hard faced, the proper rod diameter and grain size should be chosen. If the area will encounter heavy abrasion a small grain size is recommended. If a cutting action is desired a larger grain size is preferable. For hard facing and repairing tools and machine parts exposed to wear in mining, road construction, ceramic, petroleum, excavation and dredging applications.			
B (WC75)	DIN EN 14700 T Ni20 DIN 8555 G21-UM-55-CG	NiCrBSi-based with FTC Rod 4,0-8,0mm	FTC: approx. 2,360 HV NiCrBSi-alloy: 420-450 HV
WC75 is a nickel core flexible rod coated with both fused tungsten carbide (FTC) and Ni-Cr-B-Si developed for oxyacetylene welding. The deposited alloy consists of approximately 65% FTC and 35% Ni-Cr-B-Si-matrix with a matrix hardness of 45 HRC. The overlay is highly resistant to acids, bases, lye and other corrosive media and excessive wear conditions. The rod has a low melting range of between 950 - 1050°C (1,742-1,922°F) and feature a self fluxing characteristic producing a smooth, clean welded surface. Hard facing of ferritic and austenitic steels (steel castings), applied for overlaying mixer blades, screws and conveyors in chemical and dye industry, food industry. Specially recommended for stabilizer blades in the petroleum industry.			
NIA	DIN EN 14700 T Fe20 DIN 8555 MF21-65-CG	NiCrBSi-based with FTC Tube 2,8-6,0mm	FTC: approx. 2360 HV0.1 NiCrBSi-alloy: 450 - 520 HV
NIA is a cold rolled, formed, and closed seam nickel tube filled with fused tungsten carbide (FTC) and Cr, B and Si for oxyacetylene application. The deposited hard facing consists of approximately 65% FTC and 35% Ni-Cr-B-Si-matrix. NIA feature self fluxing characteristic producing a smooth, clean surface. DURMAT–NIA has a low melting point of approx. 950 – 1050°C (1,742-1,922°F). The overlay is extremely wear resistance and anti corrosive to acids, bases, lye and other corrosive media. Hard facing on ferritic and austenitic steels (steel castings), overlaying mixer blades and conveyor and screws in chemical, dye and food industry. Recommended for hard facing rock bits and stabilizers in the petroleum industry.			



WEAR PLATES

PRODUCT	CLASSIFICATION	CHEMICAL COMPOSITION (%) THICKNESS	SIZE	HARDNESS
X 700	EN 14700: Fe14 (group 10)	Base plate: 5-10mm Hardfacing: 3-8mm (Others on request)	3000x1500mm, 3000x2000mm (Special dimensions on demand)	58-62 HRC
Wear plate with chromium carbides for high abrasive wear with moderate impact. Typical applications: Ceramic industry, crushed minerals, mining, concrete etc Base material: S235, S355, S690QL (others on request)				
X 700Nb	EN 14700: Fe15 (group 10)	Base plate: 5-10mm Hardfacing: 3-8mm (Others on request)	3000x1500mm, 3000x2000mm (Special dimensions on demand)	60-62 HRC
Wear plate with chromium and niobium carbides for high abrasive wear in combination with corrosion and low impact. Typical applications: Cement and concrete pumps, ceramic industry, crushed minarl, mining, recycling etc Base material: S235, S355, S690QL (others on request)				
X 700WC	EN 14700: Fe16 (group 10)	Base plate: 5-10mm Hardfacing: 3-8mm (Others on request)	3000x1500mm, 3000x2000mm (Special dimensions on demand)	62-64 HRC
Wear plate with chromium, Niobium, tungsten and other complex carbides for extreme abrasive wear at elevated temperatures up to 650°C. Typical applications: Steel industry, fan blades for hot gas, castings, petrochemical industries etc Base material: S235, S355, S690QL (others on request)				
X 900	-	Base plate: 2-3mm Hardfacing: 2-3mm (Others on request)	2000x1000mm (Special dimensions on demand)	65-68 HRC
Ultra thin hardfaced plate with overall thickness less than 5mm. Ideally suited for areas of high wear, where weight restrictions apply. Easily formable, despite its very high hardness. Thanks to its light weight, it is most suitable for wear protection of moving partslike fan blades etc.				
X 500	-	Base plate: 5-10mm Hardfacing: 3-8mm (Others on request)	3000x1500mm (Special dimensions on demand)	52-55 HRC
Designed to be used in areas of high impact, with or without the addition of abrasion. Finely dispersed carbides embedded in a tool steel matrix Ideally suited for areas of high impact, pressure and abrasion or a combination of these.				

Base material (mm)	Coating (mm)	Total (mm)	Weight (kg/m^2)
5	3	8	62
6	4	10	78
6	6	12	92
8	5	13	100
8	8	16	125
10	8	18	140

SPECIAL APPLICATIONS

CERAMIC WEAR TUBES

Wear tubes are used in a wide variety of abrasive pneumatic transport systems. Conveying fly ash, waste materials, animal bones, cement, coal dust, glass particles and abrasive flue gas are examples of applications that create a high degree of wear in your pipe bends. In such applications ceramic wear tubes has shown multiple extended lifetimes compared to alternative solutions like welded tubes. Even up against alternative wear materials like Densit, hardened steel, Basalt and hard faced solutions, lined pipes has shown significant longer lifetime.

Besides the excellent wear resistance of ceramic wear tubes the inside surface is also very smooth. This means better flow and less material build up in your conveying system. The inside ceramic surface of the pipes has a very hard and homogeneuos structure. Therefore the surface will remain smooth and get even smoother during abrasive operation.

Wear tubes minimize maintenance costs and unplanned stops due to pipe leakage in pneumatic transport systems. With a competitive price level the wear tubes represent solutions with great economic advantage.

The wear tubes are delivered as 3-6mm steel pipe with inner pipe of 10mm ceramic. Complete leghts of 500-1000mm with flenges in both ends for easy assembly. Inner dimensions between 65-150mm.

FEROBIDE

Weldable tungsten carbide composite material, which combines high levels of wear resistance with the ease and reliability of a weldable material. The unique features of FEROBIDE closes the gap between conventional tungsten carbide which requires brazing and weldable materials which have a significant lower wear performance.

FEROBIDE is ideal in situations where brazing is not an option and for applications involving sliding wear. It has found its use in critical applications in several different industries such as agriculture, separation, mining, mixing, mineral processing and road maintenance. The material is available in a range of standard tile sizes with custom designs available upon request.

WELD ON TILES

Ceramic tiles for extreme sliding and abrasive wear without impact.
Cones for abrasive materials, conveyors, transport systems etc.
These ceramic tiles are to be welded with a washer on a steel plate and then plugged with a ceramic button.

ELEMENTS GUIDE IN HARDFACING

ELEMENT	DESCRIPTION	HARDNESSES & CARBIDES	PERFORMANCE AT TEMPERATURE	RESISTANCE TO SHOCKS	DUCTILITY	CORROSION
C	**Carbon** is the principal hardening and strengthening element in iron-based alloys. It can combine with other elements to form carbides (hard phases). The alloys' strength and hardening capability improves as the carbon content increases, whilst elongation and weldability and machinability decrease.	++++	++	- - - -	- - - -	- -
Cr	**Chromium** improves heat resistance. Steels require a minimum chromium content of around 13% to render them corrosion resistant. Higher Cr contents improve corrosion and heat resistance. Chromium tends to reduce thermal conductivity. Chromium is a generator of carbides which has the effect of improving resistance to wear.	++++	++	- - - -	- - -	++++
Mo	**Molybdenum** belongs to the category of elements that increase strength and resistance to corrosion and is therefore often used in Cr-Ni austenitic steels.	++	+++	++	-	++
Nb	**Niobium** is a powerful generator of hard carbides. This element can also be used as a stabiliser in refractory austenitic steels.	++++	+++	+	- - -	+
V	**Vanadium** is a generator of carbides and is used to reduce sensitivity to overheating. Therefore, this element is often found in high speed hot working steels.	+++	++	-	- - -	
W	**Tungsten** is a powerful generator of very hard carbides. This element increases the resistance to high temperatures and is therefore used for tool steel applications.	++++	++++	- -	- - - -	
Ti	**Titanium** combines easily with other elements such as oxygen (deoxidising effect) and carbon. Titanium carbide forms fine particles, providing good resistance to external shocks.	+++		+++	-	+
Mn	**Manganese** plays an important role by deoxidizing and desulphurising weld metal. Where there is over 12% manganese with a high carbon content, the deposit is austenitic, thus providing excellent resistance to shock and wear due to workhardening. Over 18% Manganese, the deposit becomes non-magnetic.			+++	+++	
Ni	**Nickel** is not a carbide former. It substantially improves impact strength in construction steels. Where its content exceeds 7% and there is a high chromium content, the structure becomes austenitic.		++	++	++	+
Co	**Cobalt** promotes heat resistance by slowing grain growth. In addition, it provides excellent resistance to corrosion and erosion.	++	++++	++	++	++++

CAST IRON WELDING

Cast iron normally contains a high carbon level of 2-4,5% which is almost up to 10 times the amount in normal steels. The higher carbon content lowers the melting temperature of the steel lead to less shrinking when the melted material is solidified. It also makes the process less expensive.
However this high carbon content also causes difficulties with the weldability of the material, its not impossible but there are a number of parameters you need to consider when repairing och joining different cast irons.

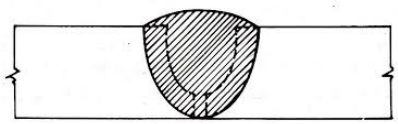
Below are the most common types of cast iron and all is considered weldable except white cast iron that require specific measures

- Grey cast iron (gråjärn): Most common, is used in 70% of all applications. Low ductility.
- White cast iron (vitjärn): High hardness & wear resistance used in special wear applications but difficult to weld
- Nodular cast iron (segjärn) : Higher ductility and tensile strenght than grey cast iron
- Malleable cast iron (aducergods): Similar properties as nodular cast iron
- Compact cast iron (kompaktjärn): Lower weight than grey cast iron and with higher properties

When welding cast iron its most important to remove all impurities before making your repair. Its very easy to get pores in the weld metal if you have oil, rust or scaling left on your part. On old worn cast iron its common that the porosity and graphite in the base metal is contaminated with these impurities and in some cases you may have to weld and then remove the weld metal many times before achieving a pore free weld deposit.

Repair weld of cracks
1. Stabilize the crack. This is achieved by either drilling a small hole in each end of the crack or weld a half moon beed in each end. Both ways will make sure the cracking does not grow further.

2. Joint preparation. You can either use a bevelling/chamfering electrode or a rotating metallic file to make a nice U-joint without sharp edges. The chamfering electrodes will also remove impurities in the base metal and give a natural U-joint. Cutting discs are not recommended because they smear out the graphite and makes the surfaces dirty again.



3. Most welding is recommended to weld without preheating, but thick work pieces or difficult shapes with high tendency of cracking may need a preheating with 500-600°C. If you preheat the best way is to heat the complete part in an oven with slow heating, constant temperature during welding and slow after cooling.

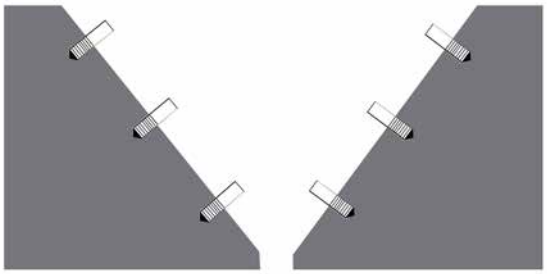
4. Use a proper filler metal with high ductility that is not sensitive to the high carbon content in the base metal. Then the filler metal will take much of the residual stress away. Pure nickel or Ferro-nickel is recommended. (See below chart for the recommended products) Often pure nickel 99% is used for root passes and where you need to have an easy machinable deposit and a ferro-nickel with higher properties are then used for the last beads to give a stronger joint or when joining cast iron to steel.

5. Minimize heat input. Make short welds, not more than 2-3cm and use low amperage. Then let it cool down and weld from the other side of the crack. After welding you use peening to relief the joint from tension stress. When the work piece is cool enough for you to place your hand on top of it you can weld again. Dont be in a hurry here!
Welding direction should be from the weld to keep the heat input low.

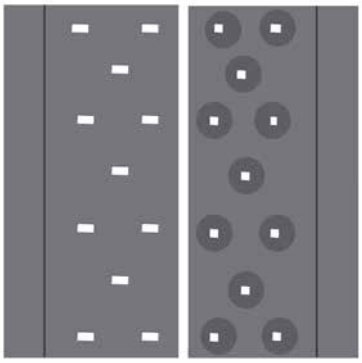
Stud-welding

A good method to use when you have major breaks in large castings is to strenghten it with stud-welding. You drill holes that you thread and fill with studs or with bolts where you cut of the bolt head after threading. The stud should be long enough to have at least the depth of the stud diameter below the surface and the same above the surface. You then weld around the studs with low heat input and without pre-heating. You use a Ferro-nickel filler metal for this application. The surface is then built up with beads between the studs and according to the procedure described in the previous page until the surface is covered with welding deposit. The following welding will now be much easier and less sensitive to heat input because the base layer will absorbe a lot of this. When using this method the joint will be much stronger.

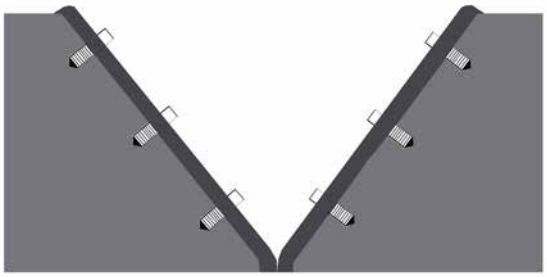
1. Studs in position



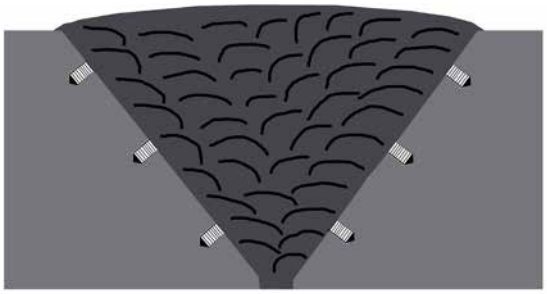
2. Angle from aboove. Beads around the studs to the left.



3. Weld deposit over the complete surfaces



4. Ready repair



Old worn out cast iron

Sometimes you have an object that is really worn out from heat and impurities. Examples can be old stoves or manifolds that is pracaticly un-weldable. Then you can after your joint preparation use an unalloyed electrode or wire and put small nests across the base metal surface. You will then give the base metal additional Iron and make it weldable again.

Then you proceed with the repair steps described earlier and you can still save your object from recycling

FILLER METAL SELECTION CHART

WELDING PROCESS	PURE NICKEL	FERRO-NICKEL	DIMENSIONS
MMA (SMAW)	61 XE	55 XE, BIMETAL	2,5-3,2mm
TIG (GTAW)	61 XT	55 XT	1,2-4,0mm
MIG (GMAW)	61 XM	55 XM	0,8-1,6mm
Cored wire (MCW)	-	116 MCW	1,2-1,6mm

PRODUCT GUIDES

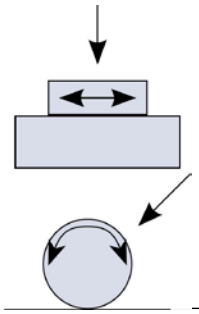
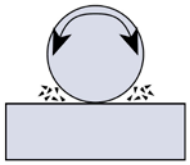
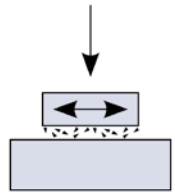
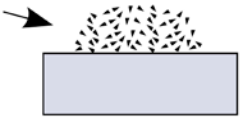
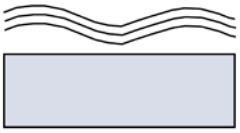
ALLOY TYPES

ALLOY TYPES ACCORDING TO DIN EN 14700:2005 ALLOY RATIO OF THE PURE WELD METAL DEPOSIT (WT-%)											
SYMBOL	SUITABILITY	C	CR	NI	MN	MO	W	V	NB	OTHER	REST
Fe1	p	<0.4	<3.5	-	0.5-3	<1	<1	-<1	-	-	Fe
Fe2	p	0.4-1.2	<7	<1	0.5-3	<1	<1	<1	-	-	Fe
Fe3	st	0.4-0.5	1-8	<5	<3	<4.5	<10	<1.5	-	Co, Si	Fe
Fe4	st(p)	0.4-1.2	2-6	<4	<3	<10	<19	<4	-	Co, Ti	Fe
Fe5	cpstw	<0.5	<0.1	17-22	<1	3-5	-	-	-	Co, Al	Fe
Fe6	gps	<2.5	<10	-	<3	<3	-	-	<10	Ti	Fe
Fe7	cpt	<0.2	4-30	<6	<3	<2	-	<1	<1	Si	Fe
Fe8	gpt	0.2-2	5-18	-	0.3-3	<4.5	<2	<2	<10	Si, Ti	Fe
Fe9	k(n)p	0.3-1.2	<19	<3	11-18	<2	-	<1	-	Ti	Fe
Fe10	ck(n)pz	<0.25	17-22	7-11	3-8	<1.5	-	-	<1.5	Si	Fe
Fe11	cnz	<0.3	18-31	8-20	<3	<4	-	-	<1.5	Cu	Fe
Fe12	c(n)z	<0.08	17-26	17-26	0.5-3	<4	-	-	<1.5	-	Fe
Fe13	g	<1.5	<6.5	<4	0.5-3	<4	-	-	-	B, Ti	Fe
Fe14	g(c)	1.5-4.5	25-40	<4	0.5-3	<4	-	-	-	-	Fe
Fe15	g	4.5-5.5	20-40	<4	0.5-3	<2	-	-	<10	B	Fe
Fe16	gz	4.5-7.5	10-40	-	<3	<9	<8	<10	<10	B, Co	Fe
Fe20	cgtz	WC	-	-	-	-	-	-	-	-	Fe
Ni1	cpt	<1	15-30	rest	0.3-1	<6	<2	<1	-	Si, Fe, B	Ni
Ni2	ckptz	<0.1	15-30	rest	<1.5	<28	<8	<1	<4	Co, Si, Ti	Ni
Ni3	cpt	<0.1	1-15	rest	0.3-1	<6	-	<1	-	Si, Fe, B	Ni
Ni4	ckptz	<0.1	1-15	rest	<1.5	<28	<15	<1	<4	Co, Si, Ti	Ni
Ni20	cgtz	WC	-	-	-	-	-	-	-	-	Ni
Co1	cktz	<0.6	20-35	<10	0.1-2	<10	<15	-	<1	Fe	Co
Co2	tz(cs)	0.6-3	20-35	<4	0.1-2	-	4-10	-	-	Fe	Co
Co3	tz(cs)	1-3	20-35	<4	<2	<10	6-14	-	-	Fe	Co
Cu1	c(n)	-	-	<6	<15	-	-	-	-	Al, Fe, Sn	Cu
Al1	cn	-	-	10-35	<0.5	<1	-	-	-	Cu, Si	Al
Cr	gn	1-5	rest	-	<1	-	-	15-30	-	Fe, B, Si, Zr	Cr

c: stainless k: work hardenable p: impact resistant t: heat resistant w: precipitation hardened
g: abrasion resistant n: non-magnetic s: edge retention z: scale resistant

WC = Fused Tungsten carbide crushed or spherical
Alloys which are not included in this table are analogies signified, but the letter Z shall be put in front

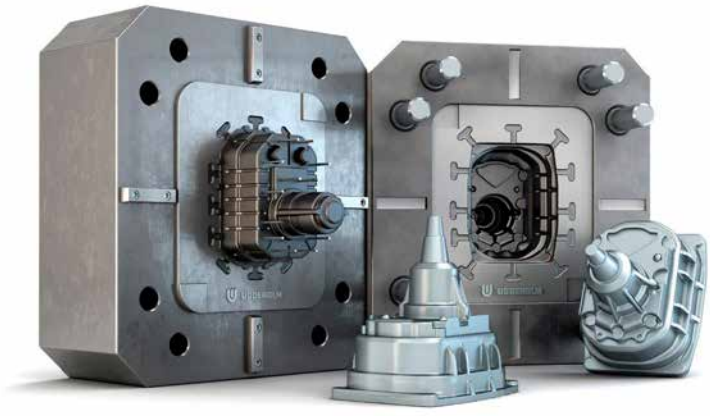
ALLOY TYPES - APPLICATIONS

STRUCTURE	WEAR	APPLICATION	ALLOY GROUPS
Solid body - solid body Solid body - friction Dry friction Mixed friction 	Sliding wear	Guide way, slide bar	Fe1, Fe2, Fe3, Cu1
	Impigent wear impact wear	Sledge hammer	Fe9, Fe10, Al1, Ni2, Ni4
		Rocker level, cams	Fe1, Fe2, Fe3
	Rolling wear Ball bearing wear	tram rail	Fe1, Fe2, Fe3, Cu1
		Rotors	Fe9, Fe10
	Rolling impact wear Thermal shock	Casting guidance roller	Fe7
		Roller conveyor roll	Fe3, Fe6, Fe7, Fe8
		Driver untis roll	Fe3
		Blacksmiths swage	Fe3, Fe4, Fe6, Fe8, Co1-3, Ni2, Ni4
	Impact sliding wear, Cold	Shear blade, cutting edge	Fe4, Fe5, Fe8, Co1-3
	Impact sliding wear, Hot	Hot shear blade	Fe3, Fe4, Co2, Ni2, Ni4
		Hole bar	Fe3, Fe4, Co2, Ni2, Ni4
Solid body - solid body with particles 	Impact sliding wear	Milling jaw, milling hammer	Fe6, Fe8, Fe9, Fe14
		Bash bar	Fe6, Fe8, Fe9
		Spike breaker	Fe6, Fe8, Fe9, Fe13-15
		Bandage for cement milling breaker	Fe13-15
		Coal-, ore- ring	Fe8, Fe13-15
		Grid bar, grid beam	Fe13-15
Solid body - particles high surface pressure and impact	Impact sliding wear	Plough share, bucket knife	Fe4, Fe5, Fe8, Co1-3
		Dropping table, chute	Fe 14-15, Ni20
		Wear plate	Fe14, Fe15, Fe20, Ni20
Solid body - solid body and particles high surface pressure 	Grooving wear	Extruder	Fe14-15, Fe20, Ni1, Ni3, Ni20, Co1-3
		Decanter	Fe14-15, Fe20, Ni1, Ni3, Ni20, Co2, Cr1
		Bucket knife	Fe15, Fe20, Ni20
		Pickup	Fe2, Fe6, Fe8
		Mixer parts	Fe6, Fe8, Fe14, Fe20, Ni1, Ni3, Ni20
		Brick pressing form	Fe6, Fe8, Fe14, Ni1, Ni3
		Milling segment, milling ring	Fe14
Solid body - particles and gas 	Particle based sliding wear (T>500°C)	Blast furnace-, converter gas valve	Fe6, Fe7, Fe8
		Blast furnace top	Fe6, Fe3, Fe8, (Fe16)
		Blast furnace feeding hopper	Fe15, Fe16
		Spike breaker, grate bar	Fe7, Co1, Co2
		Fan rotor, reinforced bar	Fe10, Fe15-16, Fe20, Ni1-4, Ni20
		Fan wheel, wear plate	Fe14-15, Fe20, Ni1, Ni3, Ni20
Solid - fluid and particles 	Elutriation wear, fluid erosion	Steel tube, wear plate	Fe14, Fe15
		Sea shovel excavator guides	Fe6, Fe8
		Fluid pump	Fe6, Fe7, Fe8, Ni1, Ni3
		Mixer parts	Fe6, Fe7, Fe8
	Erosion corrosion	Marine propeller	Cu1
		Water turbine	Fe7, Cu1
Solid - Fluid	Corrosion	Chemical valve	Fe7, Fe11, Fe12
		Gadget valve seats	Fe7, Co1-3

PRODUCT GUIDES

UDDEHOLM TOOL STEEL SELECTION GUIDE

STEELS	NORM	W.N	AISI	HARDFACING TIG	HARDFACING MMA	JOINING
HOT WORK TOOL STEELS						
Uddeholm Alvar 14				RC1	7100 E	312, 82
Uddeholm Caldie				600, RC3, M7	7110 E	312, 82
Uddeholm Dievar				RC2	7140 E	312, 82
Uddeholm Formvar				RC2	7140 E	312, 82
Uddeholm Impax extreme	P20 mod	1.2738		P20	7100 E	312, 82
Uddeholm Orvar 2 M	SS 2242	1.2344	H13	H13	7140 E	312, 82
Uddeholm Orvar superior	SS 2242	1.2344	H13	H13	7140 E	312, 82
Uddeholm Orvar supreme	SS 2242	1.2344	H13	H13	7140 E	312, 82
Uddeholm QRO 90 HT	SS 2242	1.2344	H13	H13	7140 E	312, 82
Uddeholm QRO 90 Supreme	SS 2242	1.2344	H13	H13	7140 E	312, 82
Uddeholm Unimax				600, RC3, M7	7110 E	312, 82
Uddeholm Vidar 1		1.2340	H11	RC2, H13	7140 E	312, 82
Uddeholm Vidar Superior		1.2340	H11	RC2, H13	7140 E	312, 82
COLD WORK TOOL STEELS						
Arne	SS 2640	1.2510		600, RC3, M7	7110 E	312, 82
Caldie				600, RC3, M7	7110 E	312, 82
Calmax		1.2358		600, RC3	7110 E	312, 82
Rigor	SS 2260	1.2363		600, RC3, M7	7110 E	312, 82
Sleipner				M7, RC9	7150 E	82
Sverker 3	SS 2312	1.2436		M7, RC9	7150 E	82
Sverker 21	SS 2310	1.2379		M7, RC9	7150 E	82
Unimax				600, RC3	7110 E	
Viking		1.2631		600, RC3, M7	7110 E	312, 82
Carmo				600, RC3	7110 E	312, 82



SHIELDING GASES ACC. DIN EN ISO 14175

DESIGNATION		COMPONENTS IN VOL.(%)					
MAIN GROUP	SUB GROUP	OXIDIZING		INERT		REDUCING	INERT
		CO_2	O_2	Ar	He	H_2	N_2
I	1 2 3			100 Balance[2]	 100 0,5 ≤ He ≤ 95		
M1	1 2 3 4	0,5 ≤ CO2 ≤ 5 0,5 ≤ CO2 ≤ 5 0,5 ≤ CO2 ≤ 5	 0,5 ≤ O2 ≤ 3 0,5 ≤ O2 ≤ 3	Balance[2] Balance[2] Balance[2] Balance[2]		0,5 ≤ H2 ≤ 5	
M2	0 1 2 3 4 5 6 7	5 < CO2 ≤ 15 15 < CO2 ≤ 25 0,5 ≤ CO2 ≤ 5 5 < CO2 ≤ 15 5 < CO2 ≤ 15 15 < CO2 ≤ 25 15 < CO2 ≤ 25	 3 < O2 ≤ 10 3 < O2 ≤ 10 0,5 ≤ O2 ≤ 3 3 < O2 ≤ 10 0,5 ≤ O2 ≤ 3 3 < O2 ≤ 10	Balance[2] Balance[2] Balance[2] Balance[2] Balance[2] Balance[2] Balance[2] Balance[2]			
M3	1 2 3 4 5	25 < CO2 ≤ 50 25 < CO2 ≤ 50 5 < CO2 ≤ 25 25 < CO2 ≤ 50	 10 < O2 ≤ 15 2 < O2 ≤ 10 10 < O2 ≤ 15 10 < O2 ≤ 15	Balance[2] Balance[2] Balance[2] Balance[2] Balance[2]			
C	1 2	100 Balance	 0,5 ≤ O2 ≤ 30				
R	1 2			Balance[2] Balance[2]		0,5 ≤ H2 ≤ 5 15 < H2 ≤ 50	
N	1 2 3 4 5			 Balance[2] Balance[2] Balance[2]		 0,5 ≤ H2 ≤ 10 0,5 ≤ H2 ≤ 50	100 0,5 ≤ N2 ≤ 5 5 < N2 ≤ 50 0,5 ≤ N2 ≤ 5 Balance
O	1		100				
Z	Gas mixtures with components not listed in the table or gas mixtures with a of the specified range. [3]						

"2 You may change Ar to He completely or partially
3 Two equally gas mixtures i Z must not be replaced against each other"

GAS SELECTION GUIDE

WELDING PROCESS	ALLOY	FIRST CHOICE	EXAMPLES BRAND NAMES	OPTIONS
TIG	All types	I1	MISON Ar, ARCAL PRIME	I3, R1, N2
MIG/MAG	Fe-base solid wires	M21	MISON 18, ARCAL FORCE	M20, C1
	Stainless & Nickel solid wires	M12	MISON 2, ARCAL CHROME	I3
	Stainless & Nickel FCW	M21	MISON 18, ARCAL FORCE	M20, C1
	Fe-based impact resistant FCW	M21	MISON 18, ARCAL FORCE	M20
	Fe-based impact resistant MCW	M12	MISON 18, ARCAL FORCE	M21
	Chromium carbide wires	M21	MISON 18, ARCAL FORCE	M20
	Tool steel core wires	M12	MISON 2, ARCAL CHROME	M21
	Cast Iron wires	M12	MISON 2, ARCAL CHROME	M21
	Tungsten carbide FCW	M21	MISON 18, ARCAL FORCE	M20
	Copper alloys	I1	MISON Ar, ARCAL PRIME	I3
	Cobalt MCW	I1	MISON Ar, ARCAL PRIME	I3

HARDNESS CONVERSION TABLE

HRC	HV (Vickers)	HB (Brinell)	Tensile strenght (MPa)	HRC	HV (Vickers)	HB (Brinell)	Tensile strenght (MPa)
68	940	-	-	24	260	247	835
67	900	-	-	23	254	243	820
66	865	-	-	22	248	237	800
65	832	-	-	21	243	231	780
64	800	-	-	20	238	226	-
63	772	-	-	-	222	222	-
62	746	-	-	-	216	216	-
61	720	-	-	-	210	210	-
60	697	-	-	-	205	205	-
59	674	-	-	-	200	200	-
58	653	-	2200	-	195	195	-
57	533	-	2140	-	190	190	-
56	613	-	2050	-	185	185	-
55	595	-	1980	-	180	180	-
54	577	-	1910	-	176	176	-
53	560	-	1845	-	172	172	-
52	544	500	1790	-	169	169	-
51	528	487	1730	-	165	165	-
50	513	475	1680	-	162	162	-
49	498	464	1620	-	159	159	-
48	484	451	1570	-	156	156	-
47	471	442	1530	-	153	153	-
46	458	432	1480	-	150	150	-
45	446	421	1430	-	147	147	-
44	434	409	1400	-	144	144	-
43	423	400	1360	-	141	141	-
42	412	390	1330	-	139	139	-
41	402	381	1300	-	137	137	-
40	392	371	1260	-	135	135	-
39	382	362	1230	-	132	132	-
38	272	353	1200	-	130	130	-
37	363	344	1170	-	127	127	-
36	354	336	1140	-	125	125	-
35	345	327	1110	-	123	123	-
34	336	319	1080	-	121	121	-
33	327	311	1050	-	119	119	-
32	318	301	1020	-	117	117	-
31	310	294	995	-	116	116	-
30	302	286	970	-	114	114	-
29	294	279	940	-	112	112	-
28	286	271	920	-	110	110	-
27	279	264	900	-	108	108	-
26	272	258	870	-	107	107	-
25	266	253	860	-	-	-	-

CONVERSION TABLE INCH TO MM

1 Inch = 25,4mm		
Ø mm	Ø (inch)	Ø (inch)
0.6	1/44	0.0236
0.8	1/32	0.0315
1.0	1/ 26	0.0393
1.2	3/64	0.0472
1.6	1/16	0.0629
2.0	5/64	0.0781
2.4	3/32	0.0945
3.2	1/8	0.1259
4.0	5/32	0.1574

DENSITY

METALS	CHEMICAL ELEMENTS
Ag	Silver
Al	Aluminium
Au	Gold
Bi	Bismuth
Cd	Cadmium
Co	Cobalt
Cr	Chromium
Cu	Copper
Fe	Iron
Hf	Hafnium
In	Indium
Mg	Magnesium
Mn	Manganese
Mo	Molybdenum
Ni	Nickel
Nb	Niobium
P	Phosphorus
Pd	Palladium
Sb	Antimony
Si	Silicium
Sn	Tin
Ti	Titanium
Ta	Tantalum
V	Vanadium
W	Wolfram
WC	Wolfram carbide
Zn	Zink
Zr	Zirkonium

MESH-MICRON CONVERSION TABLE

MICRON	MESH UK	MESH USA (ASTM)	MESH USA (TYLER)
8000	n/a	5/16 in	2,5
6700	1	0,265 in	3
5600	3	3,5	3,5
4750	3,5	n/a	4
4000	4	5	5
3350	5	6	6
2800	6	7	7
2360	7	8	8
2000	8	10	9
1700	10	12	10
1400	12	14	12
1180	14	16	14
1000	16	18	16
850	18	20	20
710	22	25	24
600	25	30	28
500	30	35	32
425	36	40	35
355	44	45	42
300	52	50	48
250	60	60	60
212	72	70	65
180	85	80	80
150	100	100	100
125	120	120	115
106	150	140	150
90	170	170	170
75	200	200	200
63	240	230	250
53	300	270	270
45	350	325	325
38	400	400	400
32	440	450	n/a
25	n/a	500	500
0	n/a	635	n/a

APPLICATIONS

RECYCLING, WASTE

APPLICATIONS

Roller presses, crushers, wood shredders, tire grinders, sledge pumps, pump housings, wearplates etc

Examples of filler metals:
307 E, 71160 E, FD 250K, 760, FD 55, FD 78, Co1, Co6

MINING, EARTHMOVING

APPLICATIONS

Crushers, conveyors, screw conveyors, excavator buckets, rail wagons, rails, drill pipes, drill bits, drilling equipment, wearplates, gears

Examples of filler metals:
307 E, 7160, 71160 E, 7180E, FD 250K, 760, FD 600 TIC, FD 55, FD 65, NI-FD

PAPER & PULP

APPLICATIONS

Transport screws, rotors, debarker drums, valves, hammers, rotary kiln, wearplates etc.

Examples of filler metals:
760, FD 600 TIC, FD 55, NI-FD, Co6, Co21, 82, 385

CEMENT INDUSTRY

APPLICATIONS

Kiln tyres, crusher rollers, crusher discs, furnace support rollers, rotary valves, fan blades, chutes, wearplates, etc

Examples of filler metals:
307 E, 71160 E, FD 250K,
760, FD 55, FD 65, 82, 116 MCW

OIL & GAS PETROCHEMICAL

APPLICATIONS

Ball valves, mandrels, pistons, drill bits, wear sleeves, shafts & stabilizers, rotors, pumps, compressors, tubes, valves etc.

Examples of filler metals:
Co6, Co21, NI-FD, 625, 253, 2535 E, 2133 E, 383, 385

SUGAR PLANTS

APPLICATIONS

Crusher rolls, crusher hammers, wearplates, harvesting applications etc

Examples of filler metals:
307 E, 707, FD 600 TIC, 312, FD 250K, FD 65

POWER PLANTS

APPLICATIONS

Turbine housings, turbine blades, housings, wheels, crusher rollers, crusher rings, valves, transport screws, tanks, boilers etc

Examples of filler metals:
410, 410NiMo, 309L, Co6, Co21,
FD 250K, FD 55, NI-FD

STEEL

APPLICATIONS

Continuous casting rollers, vertical rollers, blast furnace cones, forging dies, presses, sinter crushers, sieves and screens, wearplates etc

Examples of filler metals:
410, 410NiMo, 430, Co6, Co21, 520W, 521W,
CO, FD 495, 82

RAILWAYS

APPLICATIONS

Rail crossings, frogs, curves, rail head etc

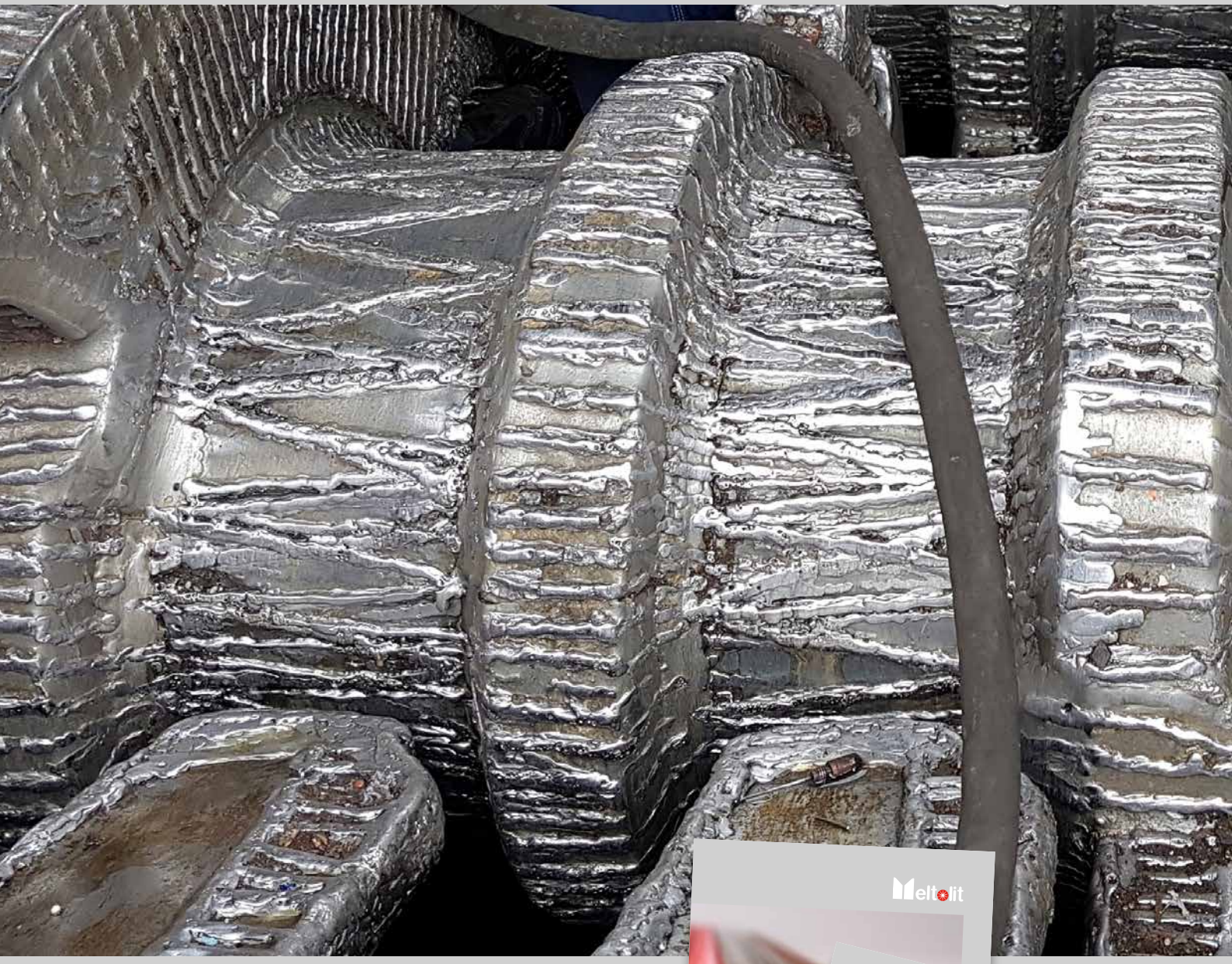
Examples of filler metals:
FD 250K, 7130 E, 307 E, 707

AGRICULTURE

APPLICATIONS

Wear plates, chutes and hoppers, fans, ploughshares, rotary valves, transport conveyors etc.

Examples of filler metals:
307 E, 7160, 71160 E, FD 250K, 760,
FD 600 TIC, FD 65, NI-FD, FD OA, WC 60, NIE, Co6



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