

# AS SD

## Electrodes for Overlay Welding and Hardfacing

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## Electrodes for Overlay Welding and Hardfacing

Product Name	C	Si	Mn	Cr	Ni	Mo	W	V	Nb	Hardness (~)	DIN 8555
AS SD - CR 10	0.70	0.60	0.70	10.00	-	-	-	-	-	55 HRC	E6-UM-55 R
AS SD - CR 13	0.10	0.50	0.30	13.00	-	-	-	-	-	45 HRC	E5-UM-45 R
AS SD - 60	0.40	0.40	0.50	6.00	-	0.60	-	-	-	58 HRC	E6-UM-60
AS SD - 65	0.70	4.00	0.30	2.00	-	-	-	-	-	60 HRC	E2-UM-60 Z
AS SD - 300	0.07	0.20	0.60	3.40	-	-	-	-	-	300 HB	E1-UM-300
AS SD - 350	0.10	0.50	0.70	3.50	-	-	-	-	-	350 HB	E1-UM-350
AS SD - HSS	0.90	1.20	1.30	4.50	-	7.50	1.80	1.50	-	65 HRC	E4-UM-60 (65) S
AS SD - MANGAN	0.70	0.10	14.00	-	3.00	-	-	-	-	450 HB	E7-UM-200 K
AS SD - MANGAN 165	0.70	0.10	14.00	-	3.50	-	-	-	-	450 HB	E7-UM-200 K
AS SD - ABRA Nb	3.40	-	-	22.00	-	-	-	-	10.00	55 HRC	(E10-UM-60 GR)
AS SD - ABRA Cr	4.50	-	-	33.00	-	-	-	-	-	60 HRC	E10-UM-60 G
AS SD - ABRAMAX 60	6.00	-	-	24.00	-	-	-	-	7.00	60 HRC	E10-UM-60 GR

# AS SD - CR 10

AS SD-CR 10 is a basic coated electrode. Wear resistant weld metal has a high toughness value and exhibits a high resistance to cracking at operating conditions with high impact. The highest wear resistance is obtained after three passes. 10 % Cr content increases the wear resistance of the weld metal to the simpler forms of corrosive attack. The weld metal is resistant to softening up to 500°C. It can be machined by grinding.

## Classification and Typical Weld Metal Composition (%)

DIN 8555 : E6-UM-55 R

C	Si	Mn	Cr
0.7	0.6	0.7	10

## Approvals

GOST , SEPRO

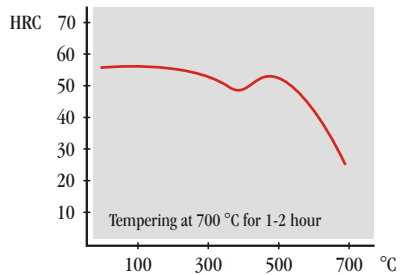
## Mechanical Properties of the Weld Metal, Typical

Hardness : 52 - 56 HRC

## Applications

It is used for hardfacing of alloyed and unalloyed steels. Worn surfaces of crushing tools in the mining industry, conveyor screws, excavator bucket and teeth, excavator and bulldozer blades, mixer parts, screws of cement pumps, and cutting edges of cold worked tool steels can be hardfaced with AS SD-CR 10.

While there is no need to have a buffer layer for unalloyed steels up to St 70; for high alloyed steels, it is recommended to have a buffer layer with AS B-248 or AS B-255, and in special cases with AS P-308 Mn or AS P-312.

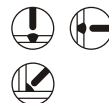


Hardening in oil or air at 950 - 1000°C  
Softening in furnace at 850°C

## Current Type : [ DC (+) / AC min. 65 V ]

## Welding Positions

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Weight (100 pcs) [ g ]
3.25	350	110 - 140	4340
4.00	450	150 - 190	8410
5.00	450	180 - 240	13460



# AS SD - CR 13

AS SD-CR 13 is a rutile coated electrode. It gives a corrosion and wear resistant ferritic-martensitic stainless steel weld metal. It is used in hardfacing applications where a hardness of 42-46 HRC is required. The weld metal is resistant to softening up to 500°C.

## Classification and Typical Weld Metal Composition (%)

DIN 8555 : E5-UM-45 R

C	Si	Mn	Cr
0.1	0.5	0.3	13

## Approvals

GOST , SEPRO

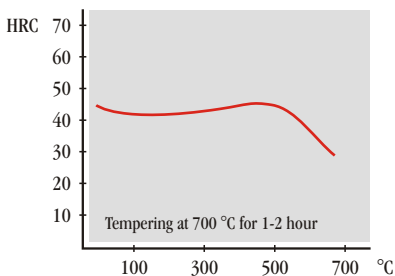
## Mechanical Properties of the Weld Metal, Typical

Hardness : 42 - 45 HRC

## Applications

It is used for hardfacing of alloyed and unalloyed steels. Worn surfaces of rails and rail surfaces, crane and conveyor wheels, cast steel valve seats, pinions, track rollers and links of earthmoving equipment can be hardfaced with AS SD-CR 13. It can also be used for joining of low carbon steels having 13 % Cr.

It is recommended to use AS SD-CR 10 in multipass applications as it is a basic coated electrode. It is also recommended to have a preheating and interpass temperature of minimum 200°C.

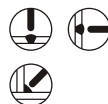


Hardening in oil or air at 980 - 1000°C  
Softening in furnace at 780 - 800°C

## Current Type : [ AC min. 70 V / DC (+) ]

## Welding Positions

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Weight (100 pcs) [ g ]
3.25	350	85 - 120	4640
4.00	350	120 - 160	6880
5.00	350	160 - 210	10600



# AS SD - 60

AS SD-60 is a general purpose, rutile coated hardfacing electrode especially designed to use with small transformers having a relatively low open circuit voltage. It is resistant to softening up to 500°C. It gives a high abrasion resistant martensitic type weld metal with a medium toughness. Weld metal can not be machined.

## Classification and Typical Weld Metal Composition (%)

DIN 8555 : E6-UM-60

C	Si	Mn	Cr	Mo
0.4	0.4	0.5	6	0.6

## Approvals

GOST , SEPRO

## Mechanical Properties of the Weld Metal, Typical

Hardness : 57 - 62 HRC

## Applications

It is used for hardfacing of alloyed and unalloyed steels. Protective lining of worn surfaces of machines used in mines, bulldozer blades, excavator teeth, crushing jaws, conveyors, agricultural and forestry machines that are exposed to wear can be hardfaced with this electrode.

## Current Type : [ AC min. 65 V / DC (+) ]

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Weight (100 pcs) [ g ]
2.50	350	60 - 120	2450
3.25	350	100 - 160	4190
4.00	450	130 - 190	8040
5.00	450	170 - 240	12760

## Welding Positions



# AS SD - 65

AS SD-65 is a basic coated electrode. It gives a high oxidation resistant (up to 850°C) weld metal that also have a high wear resistance. It is resistant to wears of medium abrasions at high temperatures.

## Classification and Typical Weld Metal Composition (%)

DIN 8555 : E2-UM-60 Z

C	Si	Mn	Cr
0.7	4.0	0.3	2

## Approvals

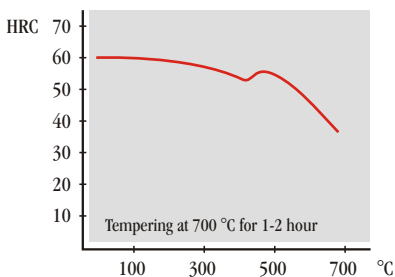
GOST , SEPRO

## Mechanical Properties of the Weld Metal, Typical

Hardness : 58 - 62 HRC (3 passes, no preheating)  
50 - 60 HRC (3 passes, 300°C preheating)

## Applications

It is particularly used for repair applications of machine parts that are particularly exposed to wear by stone, coal, sand and soil. Loading machines, band plates, wear plates and parts of grinders can be hardfaced with this electrode. It is recommended to use AS SD-65 in high temperature applications where oxidation resistance is more important than hardness and resistance to tempering like feed screws in furnaces.



Hardening in oil or air at 920 - 980°C  
Softening in furnace at 680 - 700°C

## Current Type : [ DC (+) / AC min. 70 V ]

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Weight (100 pcs) [ g ]
3.25	350	100 - 140	3370
4.00	450	150 - 190	6660
5.00	450	190 - 240	9790

## Welding Positions



# AS SD - 300

AS SD-300 is a heavily coated basic electrode particularly used for wear conditions where impact stresses are considered. It gives a weld metal that is resistant to deformations of high rolling forces including metal-to-metal friction. Weld metal is air hardenable and can be machined with carbide cutting tools. Hardness varies with respect to the number of passes and cooling rate. It has about 115 % metal recovery.

## Classification and Typical Weld Metal Composition (%)

DIN 8555 : E1-UM-300

C	Si	Mn	Cr
0.07	0.2	0.6	3.4

## Approvals

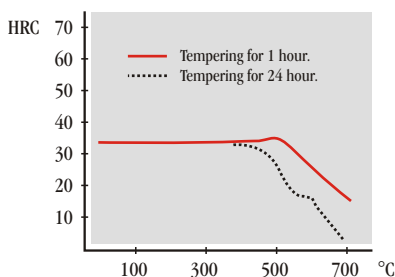
GOST , SEPRO

## Mechanical Properties of the Weld Metal, Typical

Hardness : 290 - 330 HB

## Applications

It is used for hardfacing of rollers, gears, rail crossings, switch points, brake shoes and crane wheels. Joining of heat treatable steels having a tensile strength of 80 - 90 kg/mm<sup>2</sup> is another application area.



## Current Type : [ DC (+) / AC min. 70 V ]

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Weight (100 pcs) [ g ]
3.25	350	110 - 140	3340
4.00	450	150 - 190	6730
5.00	450	190 - 230	9740

## Welding Positions



# AS SD - 350

AS SD-350 is a heavily coated basic electrode particularly used for wear conditions where impact stresses are considered. It gives a weld metal that is resistant to deformations of high rolling forces including metal-to-metal friction. Weld metal is air hardenable and can be machined with carbide cutting tools. Hardness varies with respect to the number of passes and cooling rate. It has about 115 % metal recovery.

## Classification and Typical Weld Metal Composition (%)

DIN 8555 : E1-UM-350

C	Si	Mn	Cr
0.1	0.5	0.7	3.5

## Approvals

GL

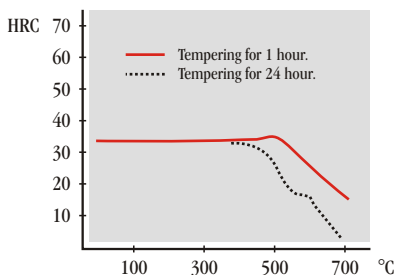
GOST , SEPRO

## Mechanical Properties of the Weld Metal, Typical

Hardness : 325 - 350 HB

## Applications

It is used for hardfacing of rollers, gears, rail crossings, switch points, brake shoes and crane wheels. Joining of heat treatable steels having a tensile strength of 80-90 kg/mm<sup>2</sup> is another application area.



## Current Type : [ DC (+) / AC min. 70 V ]

## Welding Positions

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Weight (100 pcs) [ g ]
3.25	350	110 - 140	3440
4.00	450	150 - 190	6770
5.00	450	190 - 240	10080





# AS SD - HSS

AS SD-HSS is a basic coated electrode. It gives a Mo alloyed, high speed steel type weld metal. Deposited metal retains its toughness properties at high temperatures enabling the formation of high strength welds, particularly during the hardfacing of cutting and punching tools.

## Classification and Typical Weld Metal Composition (%)

DIN 8555 : E4-UM-60 (65) S

C	Si	Mn	Cr	Mo	W	V
0.9	1.2	1.3	4.5	7.5	1.8	1.5

## Approvals

GOST , SEPRO

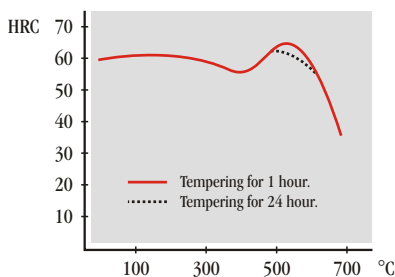
## Mechanical Properties of the Weld Metal, Typical

Hardness : 57 - 60 HRC (as welded)  
65 HRC (after double tempering)

## Applications

It is particularly used for hardfacing of cutting and punching tools made of alloyed and unalloyed steels with a hot tool steel structured weld metal. Part that is going to be welded should be preheated to 400-500°C and small beads should be preferred to inhibit overheating.

Machine tools, drilling parts, and tools made of high speed steels are among other application areas.



## Current Type : [ DC (+) / AC min. 70 V ]

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Weight (100 pcs) [ g ]
2.50	350	70 - 100	2580
3.25	350	100 - 140	4370
4.00	350	150 - 185	6680

## Welding Positions



# AS SD - MANGAN

AS SD-MANGAN is a basic coated electrode. It gives an austenitic Hadfield Manganese steel type weld metal with 13 % Mn content. 3 % Ni content increases the ductility and impact properties. Soft weld metal has a low resistance to abrasion after the application; but it hardens rapidly when cold worked or subject to gritty abrasion.

## Classification and Typical Weld Metal Composition (%)

DIN 8555 : E7-UM-200 K

AWS A5.13 : E FeMn-A

C	Si	Mn	Ni
0.7	0.1	14	3

## Approvals

GOST , SEPRO

## Mechanical Properties of the Weld Metal, Typical

Hardness : 175 - 200 HB (as welded)  
450 HB (after cold working)

## Applications

It is used for the surfacing and reclamation of austenitic 12-14 % Mn steels and joining of these to mild or medium carbon steels. Teeth used for mineral handling, cone, roll and jaw crushers, crushing and grinding hammers, screens and grid bars and parts exposing to impact can be hardsurfaced with AS SD-MANGAN.

Especially on 12-14 % Mn steels, it is important to use this electrode before using chromium carbide structured hardfacing electrodes to form a buffer layer as it enables a healthy joining of the subsequent hardsurface to the base metal.

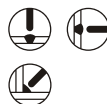
### Attention !

As % 12-14 Mn containing weld metal has poor corrosion resistance, its properties are similar to carbon steels.

## Current Type : [ DC (+) / AC min. 70 V ]

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Weight (100 pcs) [ g ]
3.25	350	80 - 140	3810
4.00	450	140 - 180	7440
5.00	450	180 - 230	11610

## Welding Positions



# AS SD - MANGAN 165

AS SD-MANGAN 165 is a zircon-basic coated electrode. It gives an austenitic Hadfield Manganese steel type weld metal with 13 % Mn content. 3.5 % Ni content increases the ductility and impact properties. Soft weld metal has a low resistance to abrasion after the application; but it hardens rapidly when cold worked or subject to gritty abrasion. It has about 165 % metal recovery.

## Classification and Typical Weld Metal Composition (%)

DIN 8555 : E7-UM-200 K

AWS A5.13 : E FeMn-A

C	Si	Mn	Ni
0.7	0.1	14	3.5

## Approvals

GOST , SEPRO

## Mechanical Properties of the Weld Metal, Typical

Hardness : 175 - 200 HB (as welded)  
450 HB (after cold working)

## Applications

It is used for the surfacing and reclamation of austenitic 12-14 % Mn steels and joining of these to mild or medium carbon steels. Teeth used for mineral handling, cone, roll and jaw crushers, crushing and grinding hammers, screens and grid bars and parts exposing to impact can be hardsurfaced with AS SD-MANGAN 165.

Especially on 12-14 % Mn steels, it is important to use this electrode before using chromium carbide structured hardfacing electrodes to form a buffer layer as it enables a healthy joining of the subsequent hardsurface to the base metal.

### Attention !

As % 12-14 Mn containing weld metal has poor corrosion resistance, its properties are similar to carbon steels.

## Current Type : [ DC (+) / AC min. 70 V ]

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Weight (100 pcs) [ g ]
2.50	350	70 - 100	3050
3.25	350	100 - 150	5350
4.00	450	150 - 185	10500
5.00	450	200 - 240	15720

## Welding Positions



# AS SD - ABRA Nb

AS SD-ABRA Nb is a basic coated electrode that is highly resistant to abrasion wear caused by fine or coarse hard minerals. Concentrated Cr and Nb carbides have been finely dispersed in its structure. In corrosive environments, it gives a better resistance to wear caused by fine minerals than hardfaced structures having an ordinary chromium carbide structure.

## Classification and Typical Weld Metal Composition (%)

DIN 8555 : (E10-UM-60 GR)

C	Cr	Nb
3.4	22	10

## Approvals

GOST , SEPRO

## Mechanical Properties of the Weld Metal, Typical

Hardness : 55 - 57 HRC

Carbide hardness : > 1500 HV

## Applications

Wear plates, dredgers, rock crushers, grinding hammers and rollers can be hardfaced with AS SD-ABRA Nb. It should not be used for more than three passes.

In applications requiring a thick deposit metal, AS P-308 Mn or AS P-312 should be used for buffering. It is crucial to have a buffer layer with AS P-308 Mn for 12-14 % Mn containing steels before hardfacing applications.

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## Current Type : [ DC (+) / AC min. 65 V ]

## Welding Positions

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Weight (100 pcs) [ g ]
3.25	350	100 - 150	5750
4.00	350	140 - 200	8930



# AS SD - ABRA Cr

AS SD-ABRA Cr is a basic coated electrode that is highly resistant to abrasion wear caused by coarse hard minerals. It has a highly concentrated chromium carbide in its structure.

## Classification and Typical Weld Metal Composition (%)

DIN 8555 : E10-UM-60 G  
AWS A5.13 : E FeCr-A1

C	Cr
4.5	33

## Approvals

GOST , SEPRO

## Mechanical Properties of the Weld Metal, Typical

Hardness : 58 - 62 HRC  
Carbide hardness : 1400 - 1500 HV

## Applications

Bucket conveyors, extruder screws, dragline buckets, dredgers, scrappers, screw conveyors, press screws, heads in ceramic industry, mixer blades and grinding rollers can be hardfaced with AS SD-ABRA Cr.

It should not be used for more than three passes. Interpass temperature should be 300-500°C.

In applications requiring a thick deposit metal, AS P-308 Mn or AS P-312 should be used for buffering. It is crucial to have a buffer layer with AS P-308 Mn for 12-14 % Mn containing steels before hardfacing applications.

## Current Type : [ DC (+) / AC min. 65 V ]

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Weight (100 pcs) [ g ]
3.25	350	115 - 170	5760
4.00	350	120 - 190	9140

## Welding Positions

