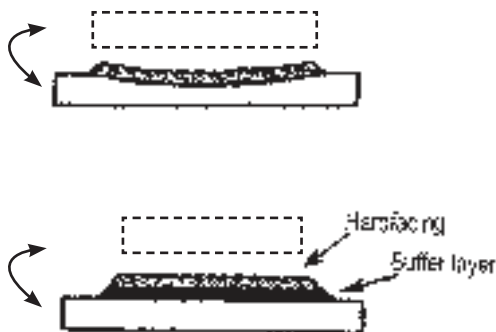


## BUFFERING

Buffer layers are used as intermediate deposits between the base material and the actual hardfacing weldmetal so that the following aspects are taken care of:

- **Good bonding with the base material**
- **Hydrogen-induced underbead cracking is avoided, even on preheated workpieces**
- **Stress consequences are minimized**
- **Effect of dilution is limited**
- **Spalling in subsequent hard layers is avoided**
- **Prevention of cracks or relief checks from the hardfaced layers running into the base material**



Generally, austenitic consumables are widely used as ductile buffer layers in hardfacing applications. The choice of consumables depends on the base material and the type of hardfacing alloy given the wear factors.

The hardfacing layer tends to sink under high load conditions if the base material is a soft one like mild steel. This can result in the hardfacing layer spalling off. A tough and strong buffer layer is applied to prevent this occurrence.



In case of hardfacing with very hard and brittle alloys like the ones containing chromium carbides or with cobaltbased alloys, there should be a buffering by an austenitic consumable for one or two layers. The compression stresses generated in the subsequent hard layers during cooling are thus accommodated, reducing the risk of cracks in the hard weld metal.

The “relief checks” present in many hardfacing deposits can propagate into the base metal under heavy impact or flexing. High strength steels are most prone to such crack propagation. This is prevented by applying a tough buffer layer.

## BUILD-UP LAYERS

In case of heavy wear, the component has to be built-up to its original dimensions. But hardfacing layers are limited to 2-3 layers. In that case, a similar type of alloy can be used to build it up before applying the hardfacing deposit. Otherwise, alternate layers of hard and ductile deposits can be made finishing off with the hard layer. E.g. hammers, crushers, cold shearing tools, and excavator teeth.



## DUROID 250

### Machinable build-up prior to hardfacing

A smooth running rutile coated general-purpose hardfacing electrode, depositing a tough air-hardening alloy weld metal, suitable for resisting moderate friction, abrasion and impact.

**ALLOY BASE:** Fe, Cr, Mn

### SPECIAL FEATURES

- Smooth arc with low spatter.
- Normally machinable weld metal.
- Deposits a weld with self-lifting slag.

### APPLICATIONS

Track links, rollers and sprockets, ropeway pulleys, trunion wearing plates, gears, shafts and general reclamation of all worn out carbon steel parts requiring

subsequent matching. Other applications are pump housing, rail ends (medium Mn steel) for railways and tramways, forging dies, wheels, axles, and couplings.

Suitable for use as a supporting buffer between a top layer of harder weld metal and a soft mild steel base. Recommended for hardfacing components and machine parts, which must be easily machinable after hardfacing.

### PROPERTIES

Hardness : 24-27 HRC

### CURRENT RANGE : (AC 50, DC±)

Size (mm)	Length (mm)	Current Range (Amp)
3.15	450	90-120
4.00	450	130-170
5.00	450	155-200

## DUROID 350

### Machinable buffer for impact and moderate abrasion

A smooth running rutile coated hardfacing electrode depositing a tough air hardening type weld metal for resisting moderate abrasion and impact. The deposit is machinable with suitable carbide tipped tools.

**ALLOY BASE:** Fe, Cr, Mn

### SPECIAL FEATURES

- Good for build-up and buffering.
- Excellent weld bead appearance.
- Deposits a weld with fine bead appearance and easy de-slagging properties.

### APPLICATIONS

Roller, tractor idler wheels, brake shoes, crane wheels, wobblers, gears, shafts, forging dies, ploughshares, conveyor parts, track rollers, drive sprockets, tie tamping bars and picks, cams, cold punching dies, etc. where resistance to abrasion combined with toughness is needed.

### PROPERTIES

Hardness : 33-36 HRC

### CURRENT RANGE : (AC 50, DC±)

Size (mm)	Length (mm)	Current Range (Amp)
3.15	450	90-120
4.00	450	120-170
5.00	450	160-240

## DUROID 650

### Abrasion resistant hardfacing

This rutile-coated electrode gives an air-hardening type weld deposit, which is resistant to severe abrasion and moderate impact between metal to mineral wearing stresses. It provides moderate resistance to corrosion and scaling.

**ALLOY BASE:** Fe, Cr, Mn

### SPECIAL FEATURES

- Smooth arc with low spatter.
- It is very easy to use in all positions. • Excellent weld bead appearance.

### APPLICATIONS

Bulldozer blades, excavator teeth, metal cutting & forming tools, hot & cold punching dies, bucket lips, chutes, conveyors, shears & croppers, oil expellers, pulping knives, ploughshares, road graders, crusher hammers, caterpillar treads, cane & bamboo cutting knives, etc. Recommended for applications involving metal to mineral wear.

### PROPERTIES

Hardness : 55-58 HRC

### CURRENT RANGE : (AC 70, DC±)

Size (mm)	Length (mm)	Current Range (Amp)
3.15	450	90-120
4.00	450	120-170
5.00	450	160-240

## DUROID 650B

### No-problem abrasion resistance even for thicker plates

A high alloyed basic hardfacing electrode depositing a nonmachinable air-hardening weld metal. The weld deposit is resistant to severe abrasion and moderate impact between metal to mineral wearing stresses. It also resists scaling upto temperatures around 300°C and also moderate corrosion.

Apart from applications on mild and medium carbon steels Duroid 650B, being basic coated, can also be used over high carbon and alloy steel base metals and on jobs of thicker cross-section. Requirement of pre-heat can be lowered or avoided altogether to obtain weld deposit free from cracks, porosity and slag inclusions when normal welding practice for basic coated electrode is followed.

**ALLOY BASE:** Fe, Cr, Mn, Mo, V

### SPECIAL FEATURES

- Can be used on thicker sections without the need of buffering.

- Smooth arc with low spatter.
- It is very easy to use in all positions. · Excellent weld bead appearance.

### APPLICATIONS

Coal cutter blades, rock drills, drill bits, oil expeller worms, cane & bamboo cutting knives, excavator teeth, hot & cold punching dies, bucket lips, dipper teeth, impellers, muller ploughs, chutes, conveyors, shears & croppers, pulping knives, ploughshares, road graders, crusher hammers, caterpillar treads & shoes, etc. This electrode is specially recommended for applications involving metal to mineral wear.

### PROPERTIES

Hardness : 57-59 HRC

### CURRENT RANGE : (AC 70, DC±)

Size (mm)	Length (mm)	Current Range (Amp)
3.15	450	100-140
4.00	450	120-180
5.00	450	160-250

## ESAB 600B

### Self-buffering abrasion resistant deposit

ESAB 600B is a basic coated electrode meant for depositing hard surface having high resistance to wear caused by scouring action or rolling friction. It is insensitive to cracking tendency so the deposit does not require any additional buffering. The weld metal consists of uniformly distributed hard carbides in a martensitic matrix which make this electrode ideally suited for hardfacing parts, subjected to severe service conditions involving a combination of abrasion, moderate impact, and friction.

Transverse relief cracks are welcome in the weld metal.

**ALLOY BASE:** Fe, Mn, C, Cr

### SPECIAL FEATURES

- Excellent weld bead appearance.
- Slag is easily detachable.

- The deposit, hard as it is, can only be finished by grinding.

### APPLICATIONS

Used for hardfacing of dredger buckets, draught bucket, working edges and surfaces of earth-moving equipment used in rocky soils, chain link, agricultural implements, vibrating shafts, steel sleeves, hammer mills, press tools, dies, punches and shears, tip of excavator, mill hammers for pulverizing coal & disintegrating chrome ore, iron ore, bucket teeth, shear blades, chutes and conveyors etc.

### PROPERTIES

Hardness : 58-61 HRC

### CURRENT RANGE : (AC 70, DC±)

Size (mm)	Length (mm)	Current Range (Amp)
3.15	450	85-120
4.00	450	90-160
5.00	450	150-240

## DUROMANGAN

### Work hardening for extreme impact and abrasion

A basic coated electrode depositing an austenitic manganese steel weld metal. The deposit is highly resistant to heavy impact and abrasion. The deposit is work hardenable. The electrode is recommended for surfacing of worn-out austenitic manganese steel parts.

It can also be used to give impact protection on carbon steels.

**ALLOY BASE:** Fe, Mn, Ni, Cr

### SPECIAL FEATURES

- Build-up is free from cracks (with proper welding procedure).

(Contd...)



- Superior arc stability than available grades of Mn Steel electrodes.
- It is very easy to use in all positions.

#### APPLICATIONS

Austenitic manganese steel components, crusher jaws, crusher hammers, crusher mantles, dredger bucket teeth, cement grinder rings, manganese steel railway points & crossings, manganese steel components used in the mining industry.

#### PROPERTIES

Hardness : As deposited : 24-26 HRC  
Work hardened : 43-45 HRC

#### WELDING PROCEDURE

- The surface to be welded should be without prior work hardening.
- 14% Mn steel should never be preheated for welding.

- Welding should be done in stringer beads directing the arc towards the weld pool keeping the heat input to the base metal minimum. Skip welding/back step welding can also be adopted.
- The weld bead can be peened with ball pen hammer immediately after welding.
- Quenching has no adverse effect on welding and should be adopted whenever possible after slag removal and peening. If possible the Mn steel job can be submerged in water during welding.

#### CURRENT RANGE : (AC 70, DC±)

Size (mm)	Length (mm)	Current Range (Amp)
3.15	450	80-120
4.00	450	130-170
5.00	450	160-220