Hardfacing electrode

Classification

AWS A5.13-00 : EFe6
DIN 8555-83 : E4-UM-60-SZ

General Description

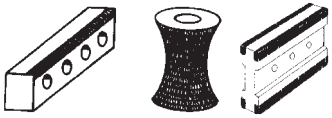
A basic coated electrode that produces a high speed steel deposit similar to M-1 tool steel
The deposited weld metal is air hardening
Designed for operator appeal and weld quality
Excellent arc characteristics, good restriking and low spatter
The electrode coating permits the use of the drag or contact welding technique.

Application

Wearshield T & D produces a crack-free wear resistant tool steel deposit with a hardness of 58-62 HRc. This hardness can be further increased to between 63-65HRc after tempering (540-600°C). It is particularly suitable for applications involving severe metal to metal wear coupled with elevated temperatures (up to 540°C). Ideally suited to the buildup of worn steel dies, cutting tools or the application of wear resistant surfaces to carbon and low alloy steels.

Typical applications include:

Punch and forging dies
Shear blades
Trimmers
Cutting tools



Mechanical properties, all weld metal

	Typical hardness values
As Welded	58-62 HRc
Tempered at 540-600°C	63-65 HRc

Welded on Mild Steel Plate (12 mm)

Packaging, available sizes and identification

	Diameter (mm)	2.5	3.2	4.0
	Length (mm)	350	350	350
Unit: Box	Pieces / unit (nominal)	85	56	35
	Net weight (kg)	2.5	2.5	2.5

Identification Imprint: Wearshield T&D Tip colour: none

Wearshield® T&D: rev. EN 15

Additional information

When welding with Wearshield T & D the weld width should be limited to between 12 - 25mm for all electrode diameters when employing a weaving technique. For edge and corner buildup narrow stringer beads are preferred.

A preheat and interpass temperature of 325°C, or higher (up to 540°C), is necessary to avoid cracking. It is important to ensure that an adequate “soak” is achieved prior to the welding operation. After welding, the component should be covered and slow cooled down to room temperature. Once cooled, the deposited weldment should be post weld heat treated to temper the martensite and toughen the deposit. Tempering at 540-600°C normally produces the optium combination of hardness and toughness.

The deposited weld metal is not machinable by conventional methods although the deposit can be shaped by grinding.

Annealing at 850°C for several hours and slow cooling will reduce the hardness to approximately 30 HRc. This deposit can be readily machined. Rehardening is achieved by heating to about 1200°C for several hours to dissolve all carbides and homogenise the steel, followed by air cooling and tempering (540-600°C).

The deposit thickness is usually limited to 4 layers.

Wearshield T & D cannot be cut by the oxy-fuel processes. Plasma arc and air-carbon arc processes can be used to both cut an gouge the weld deposit. Preheat temperature similar to those for welding may be necessary to prevent cracking along the cut edge.

Welding positions

ISO/ASME PA/1G

Current type

AC / DC electr. +

Chemical composition (w%), typical, all weld metal

C	Mn	Si	Cr	Mo	W	V
0.65	0.4	0.7	4	6.0	1.8	1.1

Structure

In the as welded condition the microstructure consists mainly of martensite with some carbides.

After tempering the microstructure is tempered martensite with secondary carbides.

Calculation data

Sizes Diam. x length (mm)	Current range (A)
3.2 x 350	80 - 100
4.0 x 350	110 - 130
5.0 x 350	130 - 160

Complementary products

Complementary products include flux cored wire Lincore® T&D