Defender

Impact resistant electrode for joining and surfacing steels.

Applications:
For joining and repairing steel and manganese steel parts used throughout the railroad, construction, and related industries.

- Extra high strength welds.
- Welds do not spall.
- Outwears ordinary hardfacing alloys for impact resistance as much as 10 to 1.
- High deposition.
- Excellent underlayment for hardfacing.

TITAN
ALLOY PRODUCTS

DEFENDER

Typical Properties:

Undiluted Weld Metal	Maximum Value up to:	
Tensile strength	119,000 psi (830 N/mm^2)	
Yield strength	72,000 psi (500 N/mm^2)	
Elongation	41%	
Hardness	Brinell 200	Rockwell C10
Work Hardness	Brinell 520	Rockwell C50

Flux Color: Grey
Microstructure: Austenite plus ferrite
Recommended Current: DC Reverse (+) or AC

Recommended Amperage Settings:

Diameter (mm)	1/8 (3.25)	5/32 (4.0)
Minimum Amperage	90	120
Maximum Amperage	150	210

Welding Position: Flat, Horizontal, Vertical Up

Deposition Rates:

Diameter (mm)	Length (mm)	Weldmetal/ Electrodes	Electrodes per lb (kg) of Weldmetal	Arc Time of Deposition Min/lb (kg)	Amperage Setting	Recovery Rate
1/8 (3.25)	14” (350)	.94 oz (26g)	17 (37)	22 (49)	115	160%
5/32 (4.0)	14” (350)	1.8 oz (50g)	9 (19)	16 (35)	150	160%

Welding Techniques: Do not pre-heat. Use the lowest possible amperage and move the electrode as quickly as feasible. Allow to cool slowly.

Matrix

Chromium carbide electrode for economical smooth overlays.

Applications:
For protecting most iron base surfaces against severe abrasive wear and moderate impact.

- Ripple free surface doubles “grip resistance” to fine abrasive media.
- Special formula totally eliminates the “Worm Tracking” type porosity common to this alloy group.
- High deposition.

TITAN
ALLOY PRODUCTS

MATRIX

Typical Properties:

Undiluted Weld Metal	**Maximum Value up to:**
Hardness	Rockwell C58-60 Vickers 670-700
Wear Co-efficient	2%

Flux Color: Grey
Microstructure: In the as-welded condition, the microstructure consists of an austenitic alloy matrix (bulk hardness RC57) and chromium/complex carbides (hardness RA 77).
Recommended Current: DC Reverse (+) or AC

Recommended Amperage Settings:

Diameter (mm)	1/8 (3.25)	5/32 (4.0)
Minimum Amperage	110	160
Maximum Amperage	140	200

Welding Position: Flat, Horizontal

Deposition Rates:

Diameter (mm)	Length (mm)	Weldmetal/ Electrodes	Electrodes per lb (kg) of Weldmetal	Arc Time of Deposition Min/lb (kg)	Amperage Setting	Recovery Rate
1/8 (3.25)	14” (350)	1.1 oz (31g)	14 (30)	23 (50)	120	180%
5/32 (4.0)	14” (350)	2.7 oz (76g)	6 (14)	17 (37)	175	180%

Welding Techniques: Use a stringer or wide weave techique. Deposit a maximum 2 to 3 passes to achieve full hardness.

Quartz

Large diameter -- low amperage
tubular hardfacing electrode for severe abrasion
and mild impact resistance on iron based parts.

Applications:
General wear protection on all iron base parts subject to abrasion.

- Thin walled tubular construction allows for very low amperages.
- Base metal dilution is negligible and maximum hardness is achieved rapidly.
- Quickest non-automated overlaying technique.
- Special bendable aluminum grip end caps allow for easy gripping and positioning of the electrode.

TITAN
ALLOY PRODUCTS

QUARTZ

Typical Properties:

Undiluted Weld Metal	**Maximum Value up to:**
Hardness	Rockwell C57-60 Vickers 665-700
Wear Co-efficient	2%

Flux Color: Dark brown
Microstructure: In the as-welded condition, the microstructure consists of an austenitic alloy matrix (bulk hardness RC57) and chromium/complex carbides (hardness RA 77).
Recommended Current: DC Reverse (+) or AC

Recommended Amperage Settings:

Diameter (mm)	1/4 (6.5)	1/2 (13.0)
Minimum Amperage	80	180
Maximum Amperage	125	380

Welding Position: Flat, Horizontal, Vertical Up, Overhead

Deposition Rates:

Diameter (mm)	Length (mm)	Weldmetal/ Electrodes	Electrodes per lb (kg) of Weldmetal	Arc Time of Deposition Min/lb (kg)	Amperage Setting
1/4 (6.5)	18” (450)	3.1 oz (87g)	5 (11)	13 (29)	100
1/2 (13.0)	18” (450)	6.3 oz (176g)	2.5 (5.5)	8 (18)	215

Welding Techniques: Using lowest possible amps, and while holding the electrode 10° from the vertical position, deposit either stringer or weave beads.