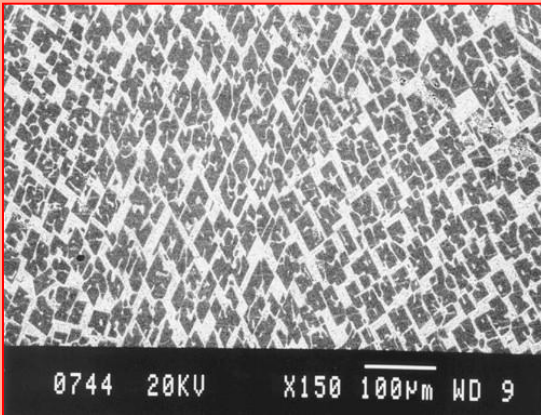


ALPHA 1800 GMAW OVERLAYS



ALPHA 1800 cored wire is the first **SYNTHESARC** product that was offered to coating applicators and industrial end-users. It is a general all purpose cored wire producing overlays with superior anti-erosion and abrasion performance and may be easily and safely deposited by welding.

- It does not contain heavy metals, nickel or chromium and does not generate hazardous substances upon welding. The wear characteristics of the weld overlays are particularly appreciated in industries that cannot tolerate nickel or chromium in their industrial processes.
- It is formulated to produce upon welding boride-rich (mainly Fe₂B) overlays. Fe₂B is a ceramic material known for its high chemical stability, high hardness, high hot hardness, high temperature oxidation resistance up to 850 °C and corrosion resistance to acids.



Scanning electron micrograph of the cross-section of an ALPHA 1800 GMAW overlay

This microstructure represents a two-pass overlay (1/4 inch thick)

ALPHA 1800 weld overlay is characterized by:

- a large amount of boride crystals (in dark). The quantity of crystals depends on the dilution obtained with welding parameters.
- a metallic phase (in light) consisting of a hardened steel.

THE HARD FACTS : ALPHA 1800 GMAW OVERLAYS COMPARED TO COMMONLY USED CHROMIUM CARBIDE OVERLAYS

OVERLAY	ABRASION ASTM G65-A (mm ³)	Slurry erosion* α: 30° (mm ³)	Slurry erosion* α: 90° (mm ³)	Dry erosion T: 25°C α:25° (mm ³ /kg)	Dry erosion T: 25°C α:90° (mm ³ /kg)	Dry erosion T:300°C α:25° (mm ³ /kg)	Dry erosion T:300°C α:90° (mm ³ /kg)
ALPHA 1800	16	0,7	2	2,5	15	5	30
Cr carbide ##	25	1	2	32	24	71	38

* Parameters for slurry jet erosion: 10 wt. % Ottawa sand in tap water, test duration: 2 hours , jet velocity: 13 m/s.

Typical chromium carbide product subjected to the same tests.

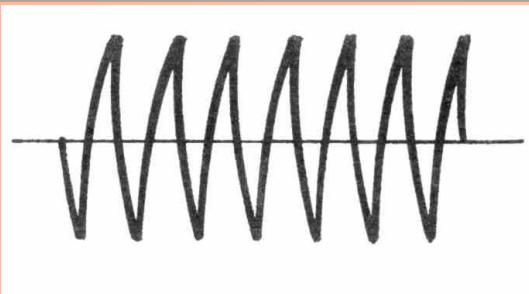
For detailed information on overlay properties and testing methods, consult the paper entitled: **Erosion and Abrasion Resistance of Boride and Carbide-Based Weld Overlays**

Deposition Parameters of ALPHA 1800 Overlays

Thick **ALPHA 1800** overlays can be obtained with the GMAW (MIG) process. GMAW parameters that lead to optimal erosion and abrasion wear resistances are the following:

GMAW welding (DCEP) with oscillator

Gas : 98% Ar - 2% O₂
Wire diameter : 1,6 mm
Voltage : 23-27 V
Wire feed rate : 115-165 inches / min
Tip-to-work distance : 3/4 inch
Travel speed : 5 inches / min
Oscillation amplitude : 1,25 inch
Oscillation speed : 40 cycles / min



Linear GMAW welding (DCEP)

Gas : 98% Ar - 2% O₂
Wire diameter : 1,6 mm
Voltage : 23-27V
Wire feed rate : 115-165 inches / min
Tip-to-work distance : ¾ inch
Travel speed : 11 inches / min



Photography of a GMAW ALPHA 1800 Overlay with Oscillated Parameters

