

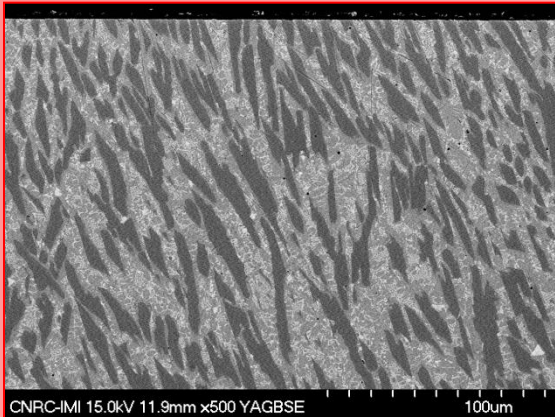
SYNTHEZITE-C GMAW OVERLAYS



SYNTHEZITE-C cored wire is the result of R&D efforts to produce by welding high performance slurry erosion resistant overlays containing chromium and molybdenum to combat corrosion in aqueous media and high temperature environments. In addition to wear resistance, **SYNTHEZITE-C** offers additional protection to industrial end-users facing corrosion issues.

SYNTHEZITE-C is formulated to produce through 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.

SYNTHEZITE-C overlays contain a large amount of fine Fe₂B crystals aligned mainly perpendicularly to the wearing surface. This particular overlay microstructure is responsible for the outstanding slurry erosion resistance at low and high impingement angles.



This microstructure represents a two-pass overlay.

SYNTHEZITE-C weld overlay is characterized by:

- fine boride crystals (in dark) aligned mainly perpendicularly to the wearing surface,
- boride crystals embedded in an hardened steel containing 18 wt.% molybdenum and 18 wt.% chromium.

Scanning electron micrograph of the cross-section of a SYNTHEZITE-C GMAW overlay

THE HARD FACTS : SYNTHEZITE-C 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)
SYNTHEZITE-C OVERLAY	10	0,1	0,1	0,5	1,5	2	8
Cr carbide OVERLAY **	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 . ** A typical chromium carbide product was subjected to the same tests.

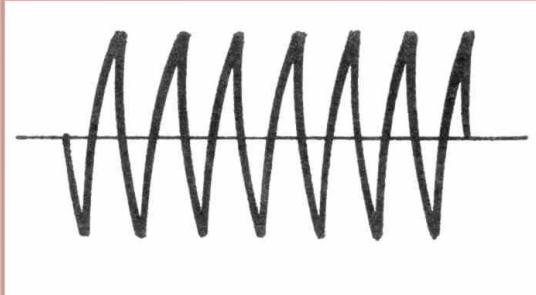
For detailed information on overlay testing methods, consult the paper entitled:
Erosion and Abrasion Resistance of Boride and Carbide-Based Weld Overlays

Deposition Parameters of SYNTHEZITE-C Overlays

SYNTHEZITE-C overlays are obtained with the GMAW (MIG) process.
GMAW parameters that lead to optimal slurry erosion resistance are the following:

GMAW welding (DCEP) with oscillator

Gas : 98% Ar - 2% O₂
Wire diameter : 1,6 mm
Voltage : 25 V
Wire feed rate : 200 inches / min
Tip-to-work distance : 3/4 inch
Travel speed : 5 inches / min
Oscillation amplitude : 1.5 inch
Oscillation speed : 40 cycles/min



Comparable slurry erosion resistance can be also obtained with the following parameters:

GMAW welding (DCEP) with oscillator

Gas : 98% Ar - 2% O₂
Wire diameter : 1,6 mm
Voltage : 25 V
Wire feed rate : 200 inch / min
Tip-to-work distance : 3/4 inch
Travel speed : 5 5/8 inches / min
Oscillation amplitude : 13/16 inch
Oscillation speed : 50 cycles/min

