TECHNICAL DATA

Powder WC Carbide –
Welding Powder

Powders WC Carbide are spheroidally shaped, two-phase tungsten carbide powders produced by a special melting process. This makes them the most wear resistant fused tungsten carbide products available on the market. The materials are designed to be the hard phase constituent of a wear-resistant surface. Depending on the surfacing process, they can be blended with self-fluxing alloys or used a filler material for rods, wires, electrodes or infiltration applications. Overlays containing these materials offer excellent abrasive wear resistance in harsh environments, combined with good impact resistance. These carbides have a fine, non-acicular structure with a higher hardness compared to conventional cast (fused) tungsten carbide. While usable in high-heat processes (PTA or conventional arc welding), these materials can exhibit phase transformation that can result in deposit embrittlement and cracking. Therefore, the best deposit results are obtainable with low heat input processes such as laser cladding and oxy-acetylene welding. As hard phase materials, these products have a hardness of 2700 to 3100 HV0.1. CTC-S offers the best compromise of excellent hardness versus good ductility. There is a very broad portfolio of applications for these products with different wear conditions

NOMINAL CHEMICAL COMPOSITION (MASS%)

W	C	Fe	Others
Bal	3,7-4,2	0,5 (max)	0,2 (max)

PHYSICAL PROPERTIES (Undiluted weld metal)

ALLOY	Particle size	Density
WC Carbide	53/20µm	0,9-11,0 g/cm^3

Key Selection Criteria

These material is fused and crushed and then sherardized using plasma densification. The spheroidal shape improves flowability and the increased apparent density results in a higher quantity of the hard phase material in the deposit with better wear resistance.
The Material is the preferred choices for laser cladding.
When PTA welding, phase transformation of this material can be quite high, especially when using matrix alloys with high chromium or iron content. This effect leads to embrittlement of the matrix alloy, thereby producing cracks within the deposits.

Key Overlay Characteristics

Characteristic

Microhardness	Recommend Hardphase / Matrix Blend Ratio
CTC-S 2700-3100 HV0.0	30 to 70%

Overlays containing CTS-S provide excellent abrasive wear resistance in harsh environments in combination with fair to good impact resistance, depending on the application technology.
Based on the sensitivity of CTC-S to phase transformation, the best-performing overlays will be produced using processes with lower heat input such as laser cladding, standard oxy-acetylene welding or GTAW (TIG) welding.
The spheroidal morphology and higher specific bulk material density of these products can result in a higher risk of settling within the deposit. Therefore, it is recommended to mix these products with irregularly shaped carbide materials, such as CTC, to improve processing stability and result in a more homogeneous deposit.
Using laser cladding, deposits containing CTC-S can exhibit the highest abrasion resistance of all tungsten carbide blend materials, while offering good impact resistance.

The risk of settling using laser cladding is quite low, so CTC-S materials can be used without the addition of irregularly shaped carbide materials.

Deloro Wear Solutions GmbH | Zur Bergpflege 51 – 53 | 56070 Koblenz | Germany
T +49 (0) 261 8088 0 | F +49 (0) 261 8088 35
Email us at: info@deloro.com | Visit us at: www.deloro.com