

## Tungsten Carbide



### Tungsten Carbide (Wc) when used in Hardbanding operations:

Running mild steel or a non-magnetic alloyed steel wires and creating a molten weld pool, then feeding tungsten carbide (Wc) via a feed hopper into the weld pool gives hardness and durability to any drill pipes, digger teeth, drag plates and shredders for the use in drilling, quarrying, excavating and recycling. It is available in many grades but for the hardbanding industry, two grades are generally used: **re-crushed** or **cast** tungsten carbide. They have significantly different properties.

The **re-crushed** material is fully sintered Wc that has been crushed into smaller particles and is used in many types of hardfacing applications. As this material is normally obtained from used Wc tools and bits, re-crushed material includes pieces with surface coatings (generally Titanium-Nitride) from the original tool or bit on some of the particle surfaces. Also, due to the fact that the matrix used to cement the particles of Wc together is either a cobalt or nickel material, the re-crushed Wc is magnetic in nature. For this reason the re-crushed Wc is used only for standard hardbanding with wires that are also magnetic in nature.

The **cast** Wc, also called cast & crushed, is a eutectic mixture of both tungsten carbides, W<sub>2</sub>C and WC, which has a particularly high degree of hardness and wear resistance. For this reason, it is primarily used in advanced wear protection and tooling technology. One of the properties of cast Wc is that it is non-magnetic in nature. So when doing tool joints or pipes that require non-magnetic properties, the cast Wc is used in conjunction with a non-magnetic wire such as an ER310 Stainless or ERNiCrMo-3 and ERNiCrMo-4 Nickel based wires.



### Tungsten Carbide Pellets

Tungsten Carbide Pellets increase the wear life of your hardfacing deposits. They are spherical in shape and have no thin edges or points to wear away. To some in the industry, this makes their use in the drilling industry “casing friendly”, but if they fracture, sharp edges are formed, causing them to once again be “casing unfriendly”

**\*\*PLEASE NOTE\*\***

Any time that Wc is added to the hardband of a tool joint, no matter what type or grit size, it is considered to be casing unfriendly. This is due to the fact that once the wire that is used to hold the Wc on the tool joint is worn down, it exposes the Wc to the casing and effectively turns the hardband into aggressive sandpaper... 20 grit, 40 grit. 100 grit etc.

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