ISO9001 Quality Management system Integrates the Advantage and Quality

Toonney uses the strictly selected powder materials, from mixture to forming, sintering, inspection and delivery, we strictly implement the quality management system to make sure getting the highest quality products.

Clean is the key for lifetime of tungsten carbide products.
**TOONNEY tungsten carbide material**

Micro technology creates the high quality products

To ensure the stable quality, Toonney precisely inspects the hardness, strength and fracture toughness in each manufacturing process, and strictly control the quality in each manufacturing step with best efforts.

**Hardness**

The index of hardness usually is HRA or HV, HRA is more common. Wc-Co alloy material has the characters that, the hardness will be lower along with the increasing of Co, and higher when grain size decreases. When temperature increases, the hardness will be deceased.

**Bending strength**

There is a simple and widely used method in hard metal area to testing the material properties. In this method, testing is done to 3 points' bending strength according to ISG/M. at the beginning, strength increases along with the increase of Cobalt content, when Co content reach about 15% the bending strength reach the peak, then decrease along with the increase of Co content. As right side chart shows.

**Compression strength**

Cemented carbide material has very good compression resistant, the two factors cobalt content and size of tungsten carbide grain effect the compression strength, right side chart shows how they effect, when cobalt content is between 4-13%, the compression strength is more than 600ps, when decreases with the increase of cobalt content or grain size.

**Fracture toughness**

Fracture toughness is a index still in use to test the must have energy and impact load to break the hard metal material. It is also called intensity pressure and fracture toughness, which control toughness, the higher the value, the harder for crack to be initiated. As the chart shows, the higher cobalt content, the higher fracture toughness, the smaller tungsten carbide grain size, the smaller fracture toughness.

**Yang's modulus (Vertical coefficient of elasticity)**

The Yang's modulus value of hard metal is 2-3 times of steel commonly, it is a very important property of the structural material. Yang's modulus will decrease along with the increase of cobalt content.

**Thermal expansion coefficient**

This index should be very important it hard metal is applied in different temperature. We can often see the example that crack is easily initiate when the hard metal welded with copper. It is because of the different thermal expansion coefficient. The TEC value of hard metal is 1.5 to 2 times of steel. As the chart shows, TEC will increase along with the increase of cobalt content.