

# Ready to Press Grade Powders for Cemented Carbide

## Technical Information Bulletin



### Introduction

Tungsten carbide grade powders are free-flowing formulations, which are ready-to-use as starting materials in the manufacture of cemented carbide tools, wear parts, and other precision components. Each powder granule contains all the constituents of the specified grade, such as tungsten carbide, cobalt, and alloy additions plus a wax binder, which also serves as a die-wall lubricant. The properties of cemented tungsten carbide tools and parts are the direct result of the starting materials and processing conditions. With this in mind, there must be a strong technical link between GTP and the parts fabricator.

For nearly 40 years, grade powders have been developed and manufactured at Global Tungsten & Powders. At our production facility in Towanda, Pennsylvania, we start with various ore concentrates and secondary raw materials (scrap) to manufacture APT, Tungsten Powders, Tungsten Carbide, Cobalt and certain alloy powders. This vertical integration offers both cost benefits and security of supply. The ability to use various secondary raw material sources provides an additional opportunity to control costs for our customers.

### Properties of typical GTP ready-to-press grade powders

Custom grades are routinely developed by GTP to meet specific customer requirements

Carbon requirements are developed to meet customer specifications

Material Type	Photo-micrograph 1500 X	Powder Properties				Cemented Carbide Properties				
		Hall Flow <sup>1</sup>	Bulk Density <sup>2</sup>	Weight Loss		Hardness <sup>3</sup>	Density <sup>4</sup>	Porosity <sup>5</sup>	Coercivity <sup>6</sup>	TRS <sup>7</sup>
				@110°C	@450°C					
<b>Custom Micrograin Grade</b> 10% Co with Paraffin		23.4	3.4	0.06%	2.2%	92.0	14.40	A02 B00 C00	240	370
<b>Custom C-2 Grade</b> 0.25% TaC / 6% Co With Paraffin		20.2	3.6	0.06%	2.1%	91.9	14.94	A02 B00 C00	206	300
<b>Custom C-5 Steelcutting Grade</b> 7.2% TiC / 10.0% TaC / 8.6% Co with Paraffin		21.1	3.2	0.06%	2.1%	91.3	12.70	A02 B00 C00	123	290
<b>Custom Mining &amp; Drilling Grade</b> 10% Co with Paraffin		22.7	3.4	0.06%	2.2%	87.9	14.51	A02 B02 C00	71	400
<b>Custom Mining Grade</b> 6% Co with Polyethylene Glycol		19.9	3.9	0.02%	3.2%	87.6	14.93	A02 B02 C00	69	300

#### Notes:

Photomicrograph - Photo of pressed and mounted grade powder magnified 1,500 times

<sup>1</sup> Hall Flow measures the flowability of the powder and is measured in seconds / 50 grams

<sup>2</sup> Bulk Density is measured in grams / cm<sup>3</sup>

<sup>3</sup> Hardness is measured on the Rockwell scale and measures the depth of an indentation of a diamond point into the material. Cemented Carbides use the Rockwell A scale

<sup>4</sup> Density is measured in grams / cm<sup>3</sup>

<sup>5</sup> Porosity is measured as follows, A-type refers to pores less than 10 μm in diameter, B-type refers to pores between 10 μm and 40 μm, and C-type is based on excess carbon content (C00 indicates carbon porosity free)

<sup>6</sup> Coercivity measures residual magnetism of a cemented carbide sample and is measured in Oersted (Oe) units

<sup>7</sup> Transverse Rupture Strength (TRS) determines the mechanical strength of cemented carbide materials and is measured in ksi (kilopounds / square inch).

### Partnering With You:

Our intention is to be more than simply a supplier, we want to be your partner. The level of customization required to meet your pressing needs is considerable. For this reason, we choose not to list a catalogue of powder products - since it is unlikely an existing powder will meet your exact requirements. We prefer to spend the time understanding your process and developing a powder solution for your unique requirements. Once a powder has been developed that meets your specifications, our quick lead times can help you manage your inventory. As your process changes to incorporate new and better techniques, GTP will work with you to ensure the powders we engineered together still meet your needs.

### Customization

Because of the high level of customization required in the manufacture of grade powders, we have chosen not to include a full product brochure in this technical bulletin. Grade powders are some of the most unique powders produced today. When it comes to ready-to-press powders, there is no such thing as "standard." GTP has developed hundreds of grades over the years and will work closely with you to produce a powder that meets your specific needs.

### Packaging

Typically each lot is packaged in a plastic bag inside a plastic pail. Each pail contains 30 kilograms of grade powder per pail. Alternative packaging can be discussed at time of order placement.



### Certification



Lot data for the above physical and chemical specifications is reported in a certificate of analysis that is provided with each shipment. Chemical analysis is performed on each lot. Additional Information is available upon request.

### History of Global Tungsten & Powders:

GTP began manufacturing tungsten powders in the 1940's. Since then, GTP has expanded its refractory metal powders production to include tungsten (including tungsten carbide, thermal spray powders and ready-to-press grade powders), molybdenum, cobalt, and tantalum powder products. GTP produces a wide range of materials, which are used in the manufacture of numerous products. These products include metal working tools for cutting, rolling, and stamping; high temperature jet engine components and protective coatings; circuit manufacturing chemicals for microelectronics; catalysts for petrochemical processing and many others. GTP is headquartered in Towanda, PA with additional manufacturing sites in Europe (Bruntal, Czech Republic) and India (Bangalore).



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