

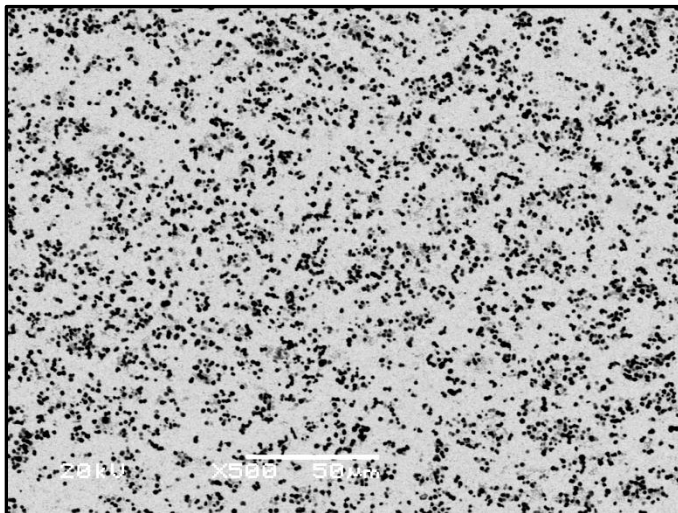
## Grade Specifications

**Grade:** NL-3-2 TCHP

**Composition:** Aluminum Oxide 7.3wt%  
 Tungsten Carbide: 82.8wt%  
 Cobalt: 9.9wt%

**Physical Properties:**

Hardness, HRA (ASTM B294) 92.5-92.8  
 Fracture Toughness, MPa√m (ISO 28079) 12.5-13.5  
 Density, g/cm<sup>3</sup> (ASTM B311) 12.4-12.5



Performance Characteristics			
	Low	Mod	High
Wear	.....	.....	.....
Impact	.....	.....	.....
Galling	.....	.....	.....
Corrosion	.....	.....	.....

**Grade Attributes:** The uniform microstructure of this material is created through encapsulation of fine Al<sub>2</sub>O<sub>3</sub> particles into a WC shell, and subsequent Co shell. Processing this powder into sintered parts or thermally applied coatings based on these chemically inert core particles create a thermally insulating material which retains exceptional hardness and toughness at elevated working temperatures.

- Typical Applications:**
- Cutting/Milling Tools
  - Industrial Mining/Tunneling
  - Sealing Surfaces
  - Thermal Spray

