



Fort Wayne Wire Die

SINGLE CRYSTAL SYNTHETIC DIAMOND DIES

A VIABLE ALTERNATIVE



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THE BEST SINGLE CRYSTAL SYNTHETIC DIAMOND DIES



An innovator in wire drawing technology for over 75 years, Fort Wayne Wire Die, Inc., is one of the first precision wire die manufacturers to offer single crystal synthetic diamond dies (SCSD). Single crystal synthetic diamonds are available as an alternative to single crystal natural diamonds. Single crystal synthetic diamonds are produced using a high pressure/high temperature process and are free from impurities, inclusions and cracks.

SINGLE CRYSTAL SYNTHETIC VS. NATURAL DIAMOND DIES

Single crystal synthetic diamond dies provide:

- Higher consistency hardness and stable microfracture-strength for predictable die life
- Superior thermal conductivity to keep dies cooler and avoid lubrication breakdown
- Long life especially for hard metal wire drawing applications
- Excellent wire surface finish
- Consistent recutability

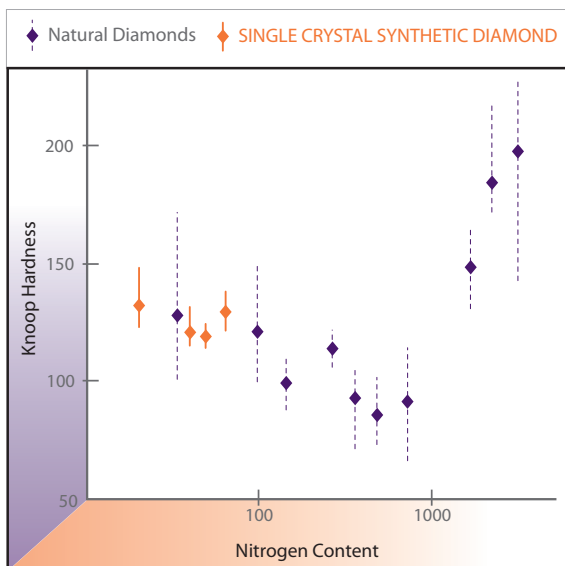
FORT WAYNE WIRE DIE SINGLE CRYSTAL SYNTHETIC DIAMOND DIES ARE ALSO

- One-piece powdered metal mounted
- Oriented in (111) diamond plane
- Precision profiled
- Available in elongation die sets

DIE MATERIAL SELECTION TABLE

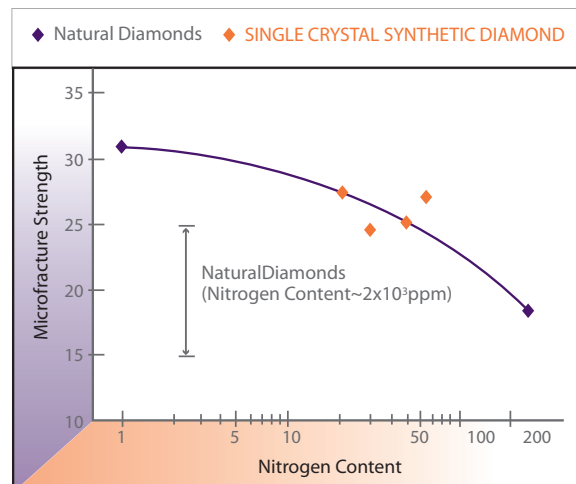
Material Characteristics	Die Material			
	SCSD	SCND	PCD	WC
Surface Finish	***	***	*	**
Resistance to Galling	***	***	*	**
Ease of Polishing / Recutting	**	**	*	***
Particle Pull Out	***	***	*	**
Toughness / Impact Strength	**	*	***	***
Generation of Micro-Fines (< 1 um)	***	***	*	**
Abrasive Wear Resistance	**	***	***	*
Corrosive Wear Resistance (Low C-steel)	**	**	**	***
Die Pull (Resistance to Drawing Forces)	***	***	*	**
Purchase Price	***	*	**	***
Uniformity of Wear / Roundness	**	**	***	*
Thermal Conductivity	***	***	**	*

* = Good ** = Better *** = Best
 SCSD = Single Crystal Synthetic Diamond, SCND = Single Crystal Natural Diamond,
 PCD = Polycrystalline Diamond, WC = Tungsten Carbide



Knoop Hardness of Synthetic and Natural Diamonds

Hardness varies with the amount of impurities in the crystals. The hardness of natural diamonds decreases as the concentration of nitrogen increases—that is, until the concentration reaches 1,000ppm, at which point the hardness intensifies significantly. Synthetic diamonds, however, are much more stable for higher consistency hardness.



Microfracture Strength of Synthetic Diamonds

The strength of synthetic diamonds decreases with the increase in nitrogen content. However, at approximately 25Gpa, they exhibit a stable strength correspondent to the highest value for natural diamonds, making them the optimum material for high-stress applications.