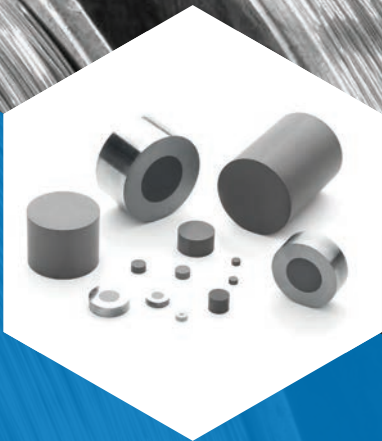


TOOLMAKER SOLUTIONS

Compax® PCD Die Blanks



Compax® polycrystalline
diamond die blanks for wire
drawing applications



HYPERION
Materials & Technologies

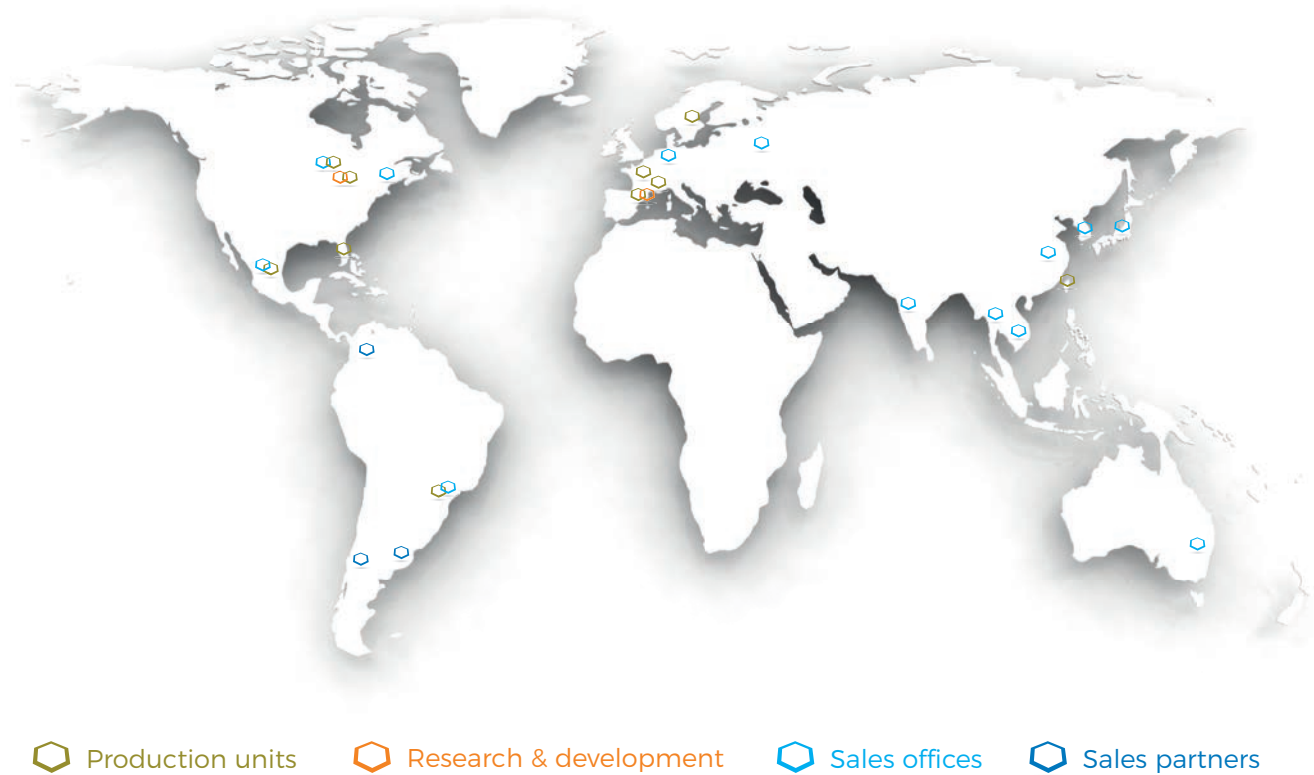
HYPERION - YOUR POLYCRYSTALLINE DIAMOND PARTNER

Hyperion Materials & Technologies is an engineering company with decades of experience with hard and super-hard materials, including diamonds (mono- and polycrystalline), cemented tungsten carbide, ready-to-press carbide powders, and cubic boron nitrides (CBNs) for your wire drawing applications. Hyperion's products are engineered to increase productivity and improve performance of our customers' products.

We are over 1,500 people dedicated to creating solutions for your hard and super-hard material needs through partnership, innovation, and invention. Hyperion's offering includes materials for wire drawing, metal forming, metal cutting, rotary cutters, mining, oil and gas, hot rolls, can tooling, and a wide range of wear protection applications. In addition to innovative materials, Hyperion offers our extensive knowledge, unique services, and application development capabilities to support our customers' competitive needs.

Our global manufacturing and supply chain organization is supported by in-house tungsten carbide and diamond manufacturing. With advanced production capabilities in powder processing pressure, sintering, high-pressure high-temperature synthesis, coating, and finishing, Hyperion can satisfy all your needs for drawing solutions.

Hyperion's technical expertise and global manufacturing facilities are a foundation from which a network of local sales and customer service teams support our customers in the development of effective solutions.



HYPERION - COMPAX® PCD FROM START TO FINISH

Hyperion's diamond micron powders are created in a single, continuous manufacturing process. Starting with the highest quality of raw materials, Hyperion uses advanced engineering methods to manufacture diamonds with specific characteristics of strength and toughness. State-of-the-art micronizing techniques assure the diamond micron powders have precisely defined sizes, shapes, and surface properties.

Hyperion's high quality micron powders serve as a raw material to produce Compax® polycrystalline diamond (PCD) products. Hyperion's superior Compax PCD wire drawing products are a result of unprecedented consistency and uniformity from the initial diamond source to the final product.

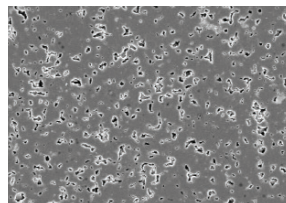
HYPERION COMPAX® PCD DIE BLANKS PRODUCT GROUPS

SELF-SUPPORTED COMPAX PCD BLANKS

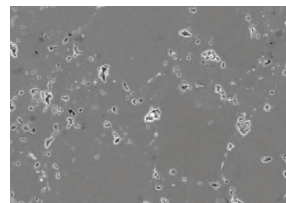


Self-supported PCD cylinders

GRAIN SIZES - AVERAGE PARTICLE SIZE



5 µm



25 µm

PRODUCT DESCRIPTION

TS GRADE

- Catalyst metal removed
- Thermally stable up to 1050°C in an inert or reducing atmosphere
- Can be mounted using high temperature, high strength metal setting powders
- Not electrically conductive: electrical discharge machining (EDM) not recommended for piercing/shaping
- Use laser, ultrasonic, or needle piercing/shaping methods.

MF GRADE

- Metal filled, contains catalyst metal
- Thermally stable up to 700°C
- Do not exceed 700°C in blank mounting
- Electrically conductive: EDM, laser, ultrasonic, or needle methods for piercing/shaping die bore may be used.

RECOMMENDED APPLICATIONS

TS OR MF GRADE

- Drawing of high carbon steel tire cord
- Drawing of smaller diameter and critical surface finish non-ferrous and ferrous wires.

TS GRADE

- High temperature drawing of tungsten/molybdenum.

POLISHING

- Hyperion diamond micron powder grade SJK-5 or GMM recommended for final die bore shaping and polishing
- For superior polish, use 0.25 µm or 0.5 µm graded diamond fines.

HYPERION COMPAX® - DIMENSIONS & AVAILABILITY CHART

SELF-SUPPORTED DIE BLANKS

ADDMA No	NOMINAL DIAMOND DIAMETER X THICKNESS (mm)	GRAIN SIZE						PRODUCT DIMENSIONS [mm]					
		Sub µm		5 µm		25 µm		DIAMOND DIAMETER	DIAMOND THICKNESS				RECOM MENDED BORE SIZE*
D6	3.1 x 1.0	5010-MFU	5010-TSU	5010-MF	5010-TS	5010-MFC	5010-TSC	3.1 ± 0.38	1.0 ± 0.13	0.08	(within diameter limits)	0.13	0.5
D12	3.1 x 1.5	5015-MFU	5015-TSU	5015-MF	5015-TS	5015-MFC	5015-TSC	3.1 ± 0.38	1.5 ± 0.13	0.08		0.13	1.0
D15	5.2 x 2.5			5025-MF	5025-TS	5025-MFC	5025-TSC	5.2 ± 0.64	2.5 ± 0.13	0.08		0.25	1.5
D18	5.2 x 3.5			5035-MF	5035-TS	5035-MFC	5035-TSC	5.2 ± 0.64	3.5 ± 0.13	0.08		0.25	2.0
D21	7.0 x 4.0			7040-MF		7040-MFC		7.0 ± 0.64	4.0 ± 0.13	0.08		0.25	3.5
D24	7.0 x 5.3			7053-MF		7053-MFC		7.0 ± 0.64	5.3 ± 0.13	0.08		0.25	4.6
	13.0 x 7.0			1370-MF		1370-MFC		13 ± 0.64	7.0 ± 0.13	0.08		0.25	5.2
D27	13.0 x 8.7			1387-MF		1387-MFC		13 ± 0.64	8.7 ± 0.13	0.08		0.25	5.8
D30	13.0 x 11.6			1311-MF		1311-MFC		13 ± 0.64	11.6 ± 0.13	0.08		0.25	7.6
	18.6 x 13.5			1813-MF		1813-MFC		18.6 ± 0.64	13.5 ± 0.13	0.08		0.25	11.2

* Maximum recommended bore size for non-ferrous wire. Hard-ferrous wire die size normally should not exceed 65% of this diameter.

ORDERING EXAMPLE: 25337501 5025-TS

HYPERION ITEM # 25337501	COMPAX DIE BLANK 5025-TS	NOMINAL DIAMOND DIAMETER (mm) 5.2	TOOL BLANK DIAMETER (mm) NA	THICKNESS (mm) 2.5	DIAMOND GRADE 5 µm
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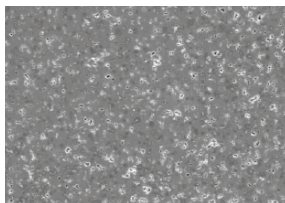
HYPERION COMPAX® PCD DIE BLANKS PRODUCT GROUPS

TUNGSTEN CARBIDE SUPPORTED COMPAX PCD BLANKS

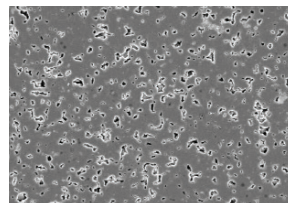


PCD core integrally bonded to a tungsten carbide support ring

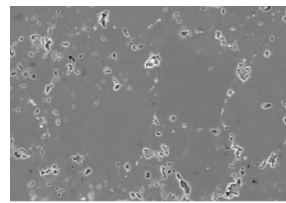
GRAIN SIZES - AVERAGE PARTICLE SIZE



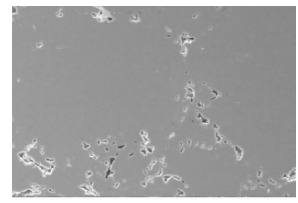
3 µm



5 µm



25 µm



50 µm

PRODUCT DESCRIPTION

- All blanks contain metal catalyst in PCD structure
- Do not exceed 700°C in die mounting operations
- Electrically conductive: diamond core may be pierced using EDM, laser, ultrasonic, or needle methods
- Profiling of die geometry is normally performed using shaped needles with EDM or ultrasonic, machines with diamond abrasives.

RECOMMENDED APPLICATIONS

25 µm AND 50 µm GRAIN SIZES

- Intermediate and rod break down drawing of copper, aluminum, and other non-ferrous materials.

5 µm AND 25 µm GRAIN SIZES

- Drawing of non-ferrous and ferrous intermediate and fine wires
- Applications where superior surface quality is a must.

3 µm AND 5 µm GRAIN SIZES

- Drawing of non-ferrous and ferrous wire in finer sizes
- Applications requiring critical surface finish.

POLISHING

- Hyperion diamond micron powder grade SJK-5 or GMM recommended for final die bore shaping and polishing
- For superior polish, use 0.25 µm or 0.5 µm graded diamond fines.

HYPERION COMPAX® - DIMENSIONS & AVAILABILITY CHART

TUNGSTEN CARBIDE-SUPPORTED DIE BLANKS

ADDMA No	NOMINAL DIAMOND DIAMETER X THICKNESS (mm)	GRAIN SIZE (µm)					PRODUCT DIMENSIONS [mm]							
		3	5†	12	25	50	TOOL BLANK DIAMETER	DIAMOND DIAMETER	DIAMOND THICKNESS					RECOMMENDED BORE SIZE*
D12	1.5 x 1.5	5233			5235		3.99 ± 0.013	1.4	1.50 ± 0.10	0.05	0.01	0.05	0.20	0.8
D15	4.0 x 2.3	5823	5523	5123	5223	5430	8.12 ± 0.013	3.8	2.24 ± 0.05	0.05	0.01	0.08	0.40	1.8
D18	4.0 x 2.9	5829	5529	5129	5229	5435	8.12 ± 0.013	3.8	2.84 ± 0.05	0.05	0.01	0.10	0.40	2.3
D21	7.0 x 4.0		5840		5240	5530	13.65 ± 0.013	6.8	3.86 ± 0.05	0.05	0.01	0.14	0.50	3.5
D24	7.0 x 5.3 13.0 x 7.0		5853		5253	5535	13.65 ± 0.013	6.8	5.13 ± 0.05	0.05	0.01	0.18	0.50	4.6
			5825		5225	5725	24.13 ± 0.025	12.7	6.98 ± 0.25	0.10	0.05	0.30	0.60	5.2
D27	13.0 x 8.7		5808	5108	5208	5730	24.13 ± 0.025	12.7	8.70 ± 0.25	0.10	0.05	0.30	0.60	5.8
D30	13.0 x 11.6 18.6 x 13.5		5811	5111	5211	5735	24.13 ± 0.025	12.7	11.60 ± 0.25	0.10	0.05	0.40	0.60	7.6
			5815		5913		34.00 ± 0.025	18.2	13.50 ± 0.50	0.10	0.05	0.45	0.75	11.2
D33	18.6 x 15.5 18.6 x 17.5				5915		34.00 ± 0.025	18.2	15.50 ± 0.50	0.10	0.05	0.52	0.75	12.0
					5917		34.00 ± 0.025	18.2	17.50 ± 0.50	0.10	0.05	0.59	0.75	12.5
D36	18.6 x 18.5				5918		34.00 ± 0.025	18.2	18.50 ± 0.50	0.10	0.05	0.62	0.75	12.7

* Maximum recommended bore size for non-ferrous wire. Hard-ferrous wire die size normally should not exceed 65% of this diameter.

† Items with 5 µm grain size shown in blue are new products made to order with a typical lead time of 2 to 3 weeks.

Item with 3 µm grain size shown in red is made to order with a typical lead time of 4 weeks.

ORDERING EXAMPLE: 11925601 5211

HYPERION ITEM # 11925601	COMPAX DIE BLANK 5211	NOMINAL DIAMOND DIAMETER (mm) 13.0	TOOL BLANK DIAMETER (mm) 24.13	THICKNESS (mm) 11.6	DIAMOND GRADE 25 µm
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HYPERION SUB-MICRON DIE BLANKS

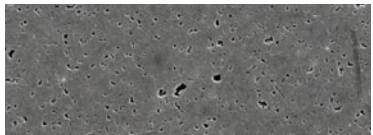
Hyperion Materials & Technologies is the leading global manufacturer of super-hard materials required for wire industrial applications. Sub-micron die blanks belong to our Compax® family of products and are one of many premium products available for the wire industry. Sub-micron die blanks are PCD product with an ultra-fine grain microstructure.

The unique material properties provide very good abrasion resistance and the ability to achieve a high quality surface finish.

TARGET APPLICATIONS

- Brass-plated wire
- Electrical wire
- Fine finishing applications
- Glass scribing
- Sawing wire
- Stainless steel
- Tire cord
- Welding wire.

PROPERTY	TYPICAL VALUE	UNITS
Diamond content	91	% vol
Diamond grain size	0.9	µm



Microstructure

STANDARD PRODUCT OFFERING

ADDMA No	DIAMETER (mm)	THICKNESS (mm)	METAL FILLED	THERMALLY STABLE	MAXIMUM RECOMMEND BORE SIZE (mm)*
D6	3.1	1.0	5010-MFU	5010-TSU	0.5
D12	3.1	1.5	5015-MFU	5015-TSU	1.0

* Maximum recommended die size for non-ferrous wire. Hard-ferrous wire die size normally should not exceed 65% of this diameter.

ABRASION TEST RESULTS

