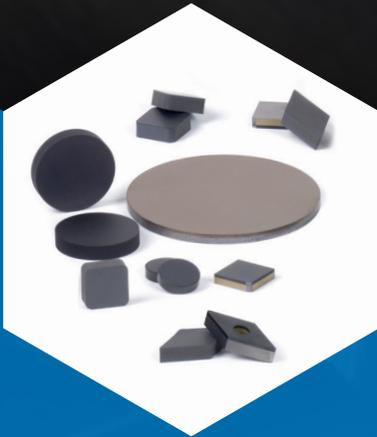


TOOLMAKER SOLUTIONS

# BZN<sup>®</sup> Compacts Tool Blanks and Inserts



Polycrystalline cubic boron nitride blanks and cut shapes for milling and turning tools



**HYPERION**  
Materials & Technologies

## BZN® COMPACTS TOOL BLANKS AND INSERTS

Hyperion manufactures a complete line of high quality polycrystalline cubic boron nitride (PCBN) products for machining ferrous materials. The BZN Compacts product line is designed to provide significantly increased tool life, consistent surface finish, and dimensional control. As a direct result, overall part cost can be significantly decreased, while at the same time gains in productivity as well as cost savings in the total manufacturing operation are successfully achieved. BZN Compacts tool blanks and inserts are available in a wide range of shapes, sizes, and grades for fabrication into finished high performance tools.



## SIX SIGMA CONTROLLED QUALITY ENGINEERED FOR SUPERIOR PERFORMANCE

A proprietary Six Sigma controlled manufacturing process provides the most consistent high quality blanks and inserts on today's market. BZN Compacts consist of fine particles of the highest quality Borazon® CBN, sintered and integrally bonded to a cemented tungsten carbide substrate or produced as solid PCBN products. The CBN crystals are randomly orientated and strongly bonded either to each other or to a ceramic matrix. This provides the tool with high wear resistance combined with superior thermal and chemical stabilities. The carbide substrate provides excellent mechanical support to the PCBN abrasive layer and allows for easy braze attachment in the fabrication of finished tools.

- Higher material removal rates
- Decreased cycle times
- Higher production output
- Faster/higher machining parameters
- Improved work piece quality
- Excellent dimensional control
- Consistent surface finishes
- Longer tool life
- Increased machine up-time
- Greater production capacity without investing in new equipment.

## BZN COMPACTS – THE CUTTING EDGE OF MODERN MACHINING

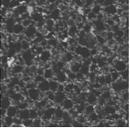
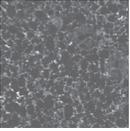
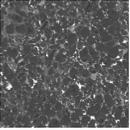
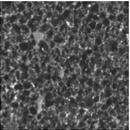
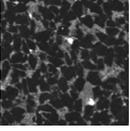
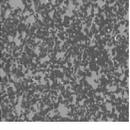
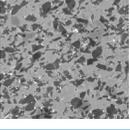
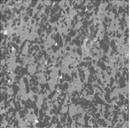
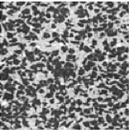
BZN Compacts tool performance excels on pearlitic gray cast irons, Cr and Ni alloyed iron, hardened steel, powder metal irons, and hard facing alloys and superalloys. In a typical machining application, tool cost is a relatively small percentage of the total production cost. The full potential and value of BZN Compacts tools over competitive and conventional tooling is evident by gains in productivity and cost savings in the total manufacturing operation.

PRODUCT SELECTION CHART

Pearlitic Gray Iron	BZN 6000	BZN 7000S
	BZN 9100	BZN 7400S
	BZN 9500	
Ductile Iron	BZN 9000	BZN V20
Hard Cast Iron	BZN 9500	
	BZN 9100	
Hardened Steel	BZN HPT130	BZN V35
	BZN HPT135	BZN 9500
	BZN V20	BZN 7300S
	BZN V25	
Sintered Powder Metal Iron	BZN 6000	BZN PM93
	BZN 9500	BZN PM161
	BZN 9100	BZN V25
	BZN 9000	BZN V35
Superalloys	BZN 6000	
White Iron	BZN 7300S	

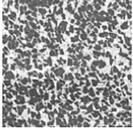
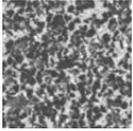
# BENEFITS OF BZN® COMPACTS

## CARBIDE SUPPORTED

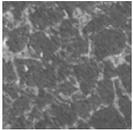
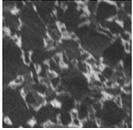
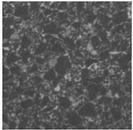
GRADE	CHARACTERISTIC	CBN CONTENT (%)	APPLICATIONS	
BZN 6000	<ul style="list-style-type: none"> <li>- High abrasion resistance</li> <li>- Wear resistance</li> <li>- Excellent edge quality and retention</li> <li>- Superior impact strength</li> <li>- Produces fine surface finishes</li> </ul>	~90%	<ul style="list-style-type: none"> <li>- Severe interrupted cuts</li> <li>- Pearlitic gray cast iron</li> <li>- Tool and die steels</li> <li>- Hard facing alloys</li> <li>- Sintered alloys</li> <li>- Finishing of Ni- and Co-based superalloys</li> <li>- Turning of sintered carbide (&gt;16% Co content)</li> </ul>	
BZN 9100	<ul style="list-style-type: none"> <li>- Excellent impact resistance</li> <li>- Good chemical stability</li> </ul>	~85%	<ul style="list-style-type: none"> <li>- Continuous to interrupted cuts</li> <li>- Cast iron</li> <li>- Powder metal alloys</li> <li>- Tool steel milling</li> </ul>	
BZN 9500	<ul style="list-style-type: none"> <li>- Improved microstructural homogeneity</li> <li>- Superior impact resistance</li> <li>- Improved wear and toughness compared to that of BZN 9100</li> <li>- Consistent and repeatable performance</li> <li>- Excellent cutting-edge quality and retention</li> </ul>	~85%	<ul style="list-style-type: none"> <li>- Continuous to Interrupted cuts</li> <li>- Cast iron</li> <li>- Powder metal alloys</li> <li>- Cylinder liner boring</li> <li>- Gear turning</li> <li>- Milling of hardened steel</li> <li>- Turning of sintered carbide (&gt;16% Co content)</li> </ul>	
BZN PM93	<ul style="list-style-type: none"> <li>- Complementary grade to BZN 9500</li> <li>- Enhanced wear properties compared to that of BZN 9500</li> </ul>	~83%	<ul style="list-style-type: none"> <li>- Powder metal applications where carbide content is lower</li> <li>- Continuous to medium interrupted cuts</li> </ul>	
BZN 9000	<ul style="list-style-type: none"> <li>- Excellent abrasion resistance</li> <li>- Good chemical stability</li> </ul>	~83%	<ul style="list-style-type: none"> <li>- Excellent in machining of ductile iron</li> <li>- Powder metal applications where carbide content is lower</li> <li>- Continuous to lightly interrupted cuts</li> </ul>	
BZN PM161	<ul style="list-style-type: none"> <li>- Excellent chemical stability</li> <li>- Impact resistant</li> <li>- Provides excellent surface finishes</li> </ul>	~65%	<ul style="list-style-type: none"> <li>- Sintered metals with high alloy content</li> <li>- Exhaust and intake valve machining</li> <li>- Continuous cuts</li> </ul>	
BZN HPT130	<ul style="list-style-type: none"> <li>- Superior chemical wear resistance</li> <li>- Excellent surface finishes</li> </ul>	~40%	<ul style="list-style-type: none"> <li>- High speed continuous turning (finishing)</li> <li>- Case hardened steels @ 220 m/min or greater</li> </ul>	
BZN HPT135	<ul style="list-style-type: none"> <li>- Excellent chemical and abrasion</li> <li>- Wear resistance</li> <li>- Excellent surface finishes</li> <li>- Exceptionally long tool life</li> <li>- Improved impact resistance compared to that of HPT130</li> </ul>	~55%	<ul style="list-style-type: none"> <li>- Continuous to slightly interrupted cuts</li> <li>- Case hardened steels</li> <li>- Thru hardened steels</li> <li>- Typical speeds @ 180 m/min or greater</li> </ul>	
BZN V20	<ul style="list-style-type: none"> <li>- Excellent balance of flank and crater wear resistance</li> <li>- Good chipping resistance</li> <li>- Suitable for both wet and dry conditions</li> </ul>	~60%	<ul style="list-style-type: none"> <li>- Continuous to mild interrupted turning</li> <li>- Hardened steel and cold work tool steels</li> <li>- Typical speeds @ 100 - 175 m/min</li> </ul>	

# BENEFITS OF BZN® COMPACTS

## CARBIDE SUPPORTED

GRADE	CHARACTERISTIC	CBN CONTENT (%)	APPLICATIONS	
BZN V25	<ul style="list-style-type: none"> <li>- Superior edge toughness</li> <li>- Good flank and crater wear resistance</li> <li>- Suitable for both roughing and finishing cuts</li> </ul>	~65%	<ul style="list-style-type: none"> <li>- Continuous to medium interruption</li> <li>- Hardened steels</li> <li>- Powder metal machining</li> <li>- CV joint applications (milling and turning)</li> <li>- Typical speeds @ 140-220 m/min</li> </ul>	
BZN V35	<ul style="list-style-type: none"> <li>- Superior edge toughness</li> <li>- Suitable for both roughing and finishing cuts</li> </ul>	~70%	<ul style="list-style-type: none"> <li>- Mild to heavy interruption</li> <li>- Valve seat machining</li> <li>- CV joint applications</li> <li>- Typical speeds @ 80-150 m/min</li> </ul>	

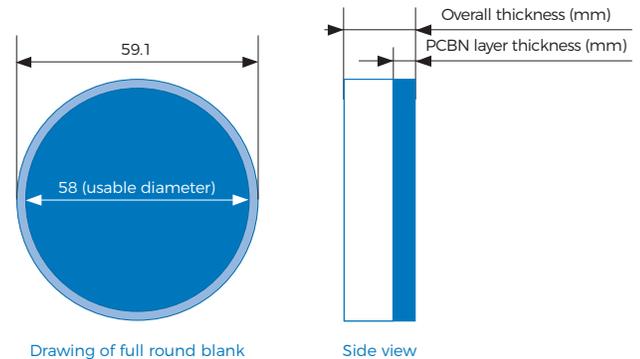
## SOLID PCBN

GRADE	CHARACTERISTIC	CBN CONTENT (%)	APPLICATIONS	
BZN 7000S	<ul style="list-style-type: none"> <li>- High fracture toughness</li> <li>- Excellent wear resistance and chemical stability</li> <li>- Tight dimensional control</li> <li>- Consistent surface finishes</li> </ul>	~85%	<ul style="list-style-type: none"> <li>- Ni-hard cast iron</li> <li>- Hard cast iron, cylinder liners</li> <li>- High chrome alloy steels</li> <li>- Powder metal alloys</li> <li>- Pearlitic gray cast iron</li> <li>- Brake rotors/disks</li> <li>- Depths of cut up to 4 mm</li> </ul>	
BZN 7400S	<ul style="list-style-type: none"> <li>- Tailored particle distribution for higher cutting speeds</li> <li>- High fracture toughness</li> <li>- Excellent wear resistance and chemical stability</li> <li>- Tight dimensional control</li> <li>- Consistent surface finishes</li> <li>- Superior thermal conductivity</li> </ul>	~88%	<ul style="list-style-type: none"> <li>- Ni-hard cast iron</li> <li>- Hard cast iron, cylinder liners</li> <li>- High chrome alloy steels</li> <li>- Powder metal alloys</li> <li>- Pearlitic gray cast iron</li> <li>- Brake rotors/disks</li> <li>- Depths of cut up to 4 mm</li> </ul>	
BZN 7300S	<ul style="list-style-type: none"> <li>- Optimized particle distribution for optimal performance</li> <li>- High abrasive wear resistance</li> <li>- Heat and chemical wear resistance</li> <li>- Excellent impact toughness</li> <li>- Performance achieved at higher speeds</li> </ul>	~75%	<ul style="list-style-type: none"> <li>- High chrome and Ni iron alloys (white iron)</li> <li>- Turning of steel rolls</li> <li>- Impellers &amp; slurry pump machining</li> <li>- Depths of cut up to 5 mm</li> </ul>	

### OVERALL THICKNESS RANGES FOR EACH GRADE AND LAYER OPTION

BZN COMPACT GRADE	PCBN LAYER		OT Thickness Range
	0.5 - 0.8	0.8 - 1.1	
6000 / 9100 / 9500	1.0 - 3.2	1.4 - 4.8	
PM93 / 9000 / PM161 / V35 V25 / V20 / HPT135 / HPT130	1.0 - 3.2	1.4 - 3.2	

Standard overall thicknesses include 1.0, 1.2, 1.4, 1.6, 2.0, 2.4, 2.5, 3.2, and 4.8.  
Additional thicknesses and tolerances available upon request depending on opportunity.



To see size and availability, please visit [www.HyperionMT.com](http://www.HyperionMT.com).

# PROPERTIES, THICKNESS AND AVAILABILITY

## EDM AND LASER CUT SEMI-FINISHED INSERTS

SHAPE	PRODUCT CODE REFERENCE	ANSI	ISO	SOLID		CARBIDE SUPPORTED	THICKNESS (mm)
				IC (mm)	IC (mm)	IC (mm)	
				EDM Cut	Laser Cut	EDM Cut	
				7300S	7000S / 7400S	6000 / 9100 / 9500	
 Rounds	BRNU-32X	RNU-32	RNUN-0903	9.8	10.0	9.8	3.2
	BRNU-33X	RNU-33	RNUN-0904	9.8	10.0	9.8	4.8
	BRNU-42X	RNU-42	RNUN-1203	13.1	13.2	13.1	3.2
	BRNU-43X	RNU-43	RNUN-1204	13.1	13.2	13.1	4.8
	BRNU-63X	RNU-63	RNUN-1904	19.4	19.5	19.4	4.8
	BRNU-83X	RNU-83	RNUN-2504	25.7	26.0	25.7	4.8
 Squares	BSNU-32X	SNU-32	SNUN-0903	9.8	10.0	9.8	3.2
	BSNU-33X	SNU-33	SNUN-0904	9.8	10.0	9.8	4.8
	BSNU-42X	SNU-42	SNUN-1203	13.0	13.2	13.0	3.2
	BSNU-43X	SNU-43	SNUN-1204	13.0	13.2	13.0	4.8
 Rhombus	BCNU-32X	CNU-32	CNUN-0903	9.8	10.1	9.8	3.2
	BCNU-33X	CNU-33	CNUN-0904	9.8	10.1	9.8	4.8
	BCNU-42X	CNU-42	CNUN-1203	13.0	13.2	13.0	3.2
	BCNU-43X	CNU-43	CNUN-1204	13.0	13.2	13.0	4.8
 Triangles	BTNU-22X	TNU-22	TNUN-1103	6.6	7.0	6.6	3.2
	BTNU-32X	TNU-32	TNUN-1603	9.8	10.0	9.8	3.2
	BTNU-33X	TNU-33	TNUN-1604	9.8	10.0	9.8	4.8

BZN 7000S/7400S grades are laser cut as the material is not conductible. Therefore, the IC is oversized due to laser chipping and kerf.

Additional sizes and shapes may be available upon request.

BZN HPT130, HPT135, V-Series, and VS-Series can be ordered as full top inserts upon request. Maximum thickness is 3.2 mm.

To see size and availability, please visit [www.HyperionMT.com](http://www.HyperionMT.com).

## THICK BZN 9100 COMPACTS FOR ENDMILLS

Thick BZN 9100 Compacts cut parts offer a tungsten carbide base with a thicker CBN layer. The BZN 9100 Compacts parts are manufactured and sold as carbide supported cylinders that are to be manufactured into endmills for machining hardened ferrous materials.

### PERFORMANCE CHARACTERISTICS

- Machines harder materials
- Single tool solution
- Consistent and repeatable performance
- Provides better finishes
- High-speed machining
- Greatly improved tool life.

### THICK BZN 9100 PRODUCT OFFERING

PCBN LAYER (mm)	OVERALL THICKNESS (mm)	PCBN LAYER TOLERANCE (mm)	OVERALL THICKNESS TOLERANCE (mm)	DIAMETER (mm +/- 0.10)
0.8	10	+0.3 / -0.0	+0.1 / -0.0	1.5 - 8.5
1.4	4.8 (or 3.7)*	+0.3 / -0.0	+0.1 / -0.0	1.5 - 8.5
1.5	8 (or 6.5)	+0.3 / -0.0	+0.1 / -0.0	1.5 - 8.5
1.7	4.8 (or 4.5)	+0.3 / -0.0	+0.1 / -0.0	1.5 - 8.5
1.7	8.5	+0.3 / -0.0	+0.1 / -0.0	1.5 - 8.5
2.0	8.0 (or 7.5)	+0.3 / -0.0	+0.1 / -0.0	1.5 - 8.5
2.3	8.0 (or 6.3)	+0.3 / -0.0	+0.1 / -0.0	1.5 - 8.5
2.5	8.5	+0.3 / -0.0	+0.1 / -0.0	1.5 - 8.5
3	13 (or 10 or 8)	+0.3 / -0.0	+0.1 / -0.0	1.5 - 8.5

\*Dimensions noted in parenthesis are available upon request.

ORDERING EXAMPLE: 60157301 BDP1-N R4.3L8.0N8.0 2.0 91

HYPERION ITEM #	BZN DRILL PIN	DIAMETER	LENGTH	LAYER	PRODUCT
60157301	BDP1-N	4.3	8.0	2.0	9100

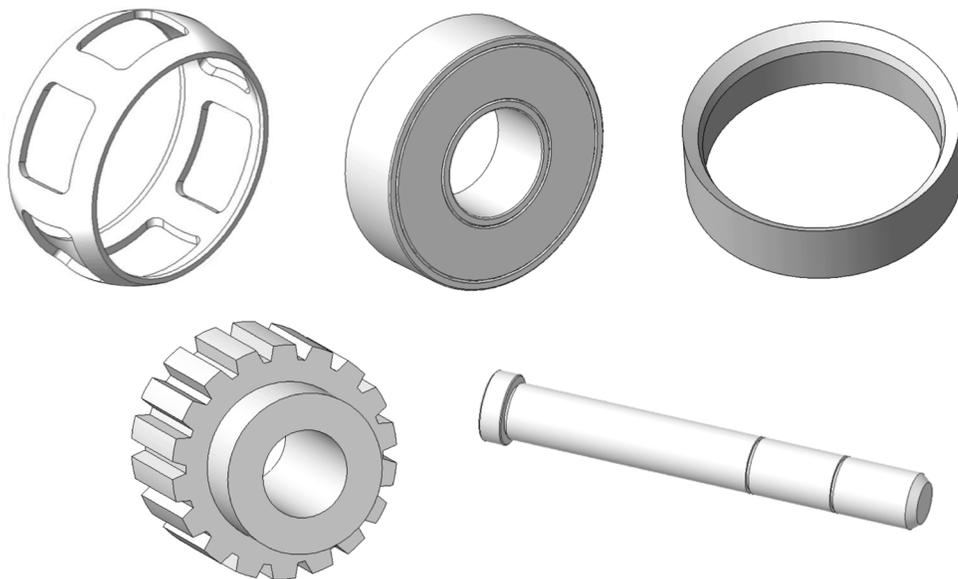
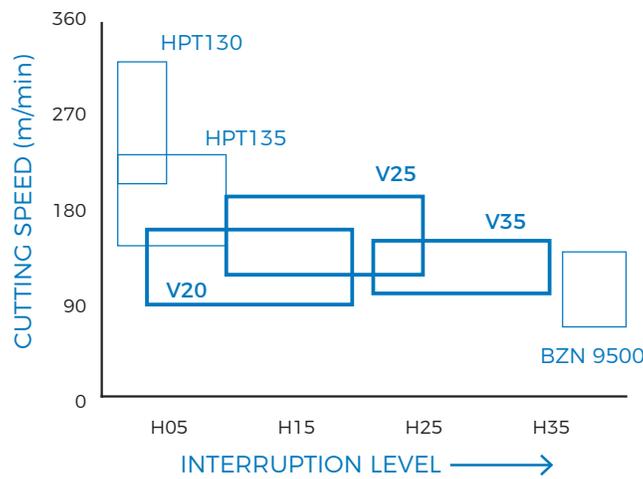
To see size and availability, please visit [www.HyperionMT.com](http://www.HyperionMT.com).

# BZN V-SERIES COMPACTS

Machining of hardened steels continues to be ever more challenging as alloying compositions change and machine tools and fabrication features evolve. The variety of applications at any end user requires a stocking of multiple PCBN grades. Thus, there is an inherent need for PCBN grades that can adequately cover these wide ranging applications. With this motivation, Hyperion introduced the BZN V-Series, i.e., Versatility-Series, to allow customers maximum flexibility in machining of hardened ferrous materials. The BZN V-Series grades are designed to provide versatility in three key aspects:

- Workpiece composition - case hardened, bearing steels, powder metal alloys, alloy steels, and tool steels
- Application demands - turning, milling and reaming
- Component type - bearings, shafts, gears, CV joint components, valve seat machining, and die/mold components.

In addition to versatility in applications, the BZN V-Series provides customers with enhanced wear and fracture resistance, performance repeatability, and uniform layer thickness.

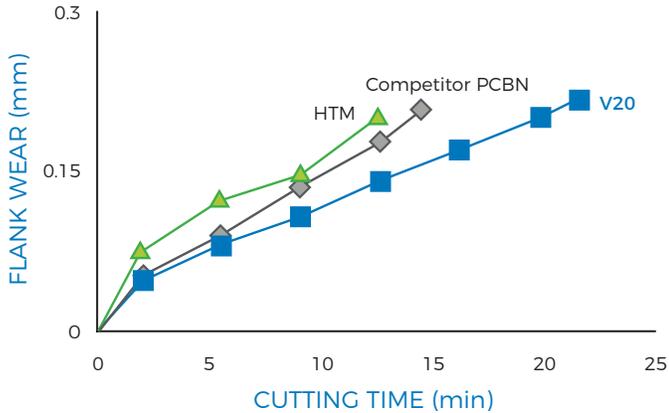


To see size and availability, please visit [www.HyperionMT.com](http://www.HyperionMT.com).

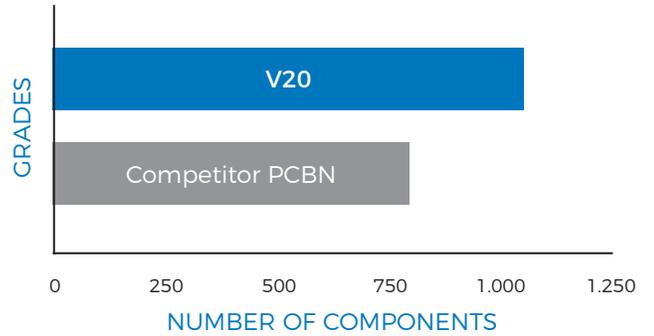
# BZN V20

## PCBN GRADE FOR HARDENED STEEL MACHINING

- Designed for continuous to mild interrupted turning
- Excellent balance of flank and crater wear resistance
- Good chipping resistance
- Suitable for both wet and dry conditions.



Work Material - 100Cr6, HRc 60-62  
 Insert CNGA120408  
 Vc = 130 m/min, ap = 0.25 mm, f = 0.1 mm/rev, dry

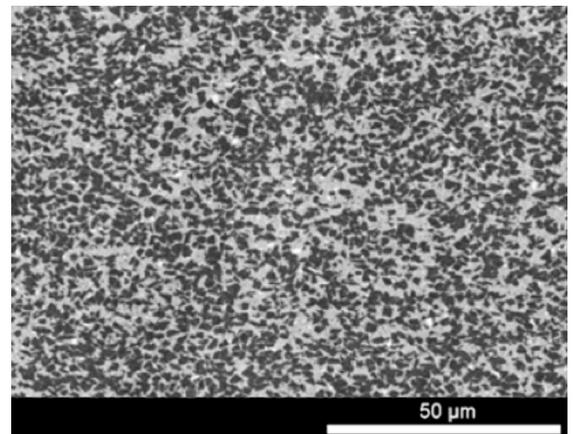
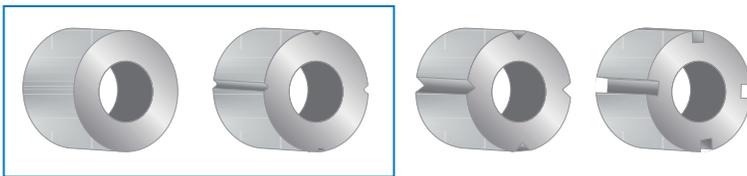


Work Material - 100Cr6, HRc 58  
 Taper bearing  
 Vc = 200 m/min, ap = 0.17 mm, f = 0.15-0.2 mm/rev, wet

## APPLICATIONS

BZN Grade V20 is recommended for machining:

- Hardened steel (wet and dry)
- Valve seat materials
- Cold work tool steels.



## GRADE SUMMARY

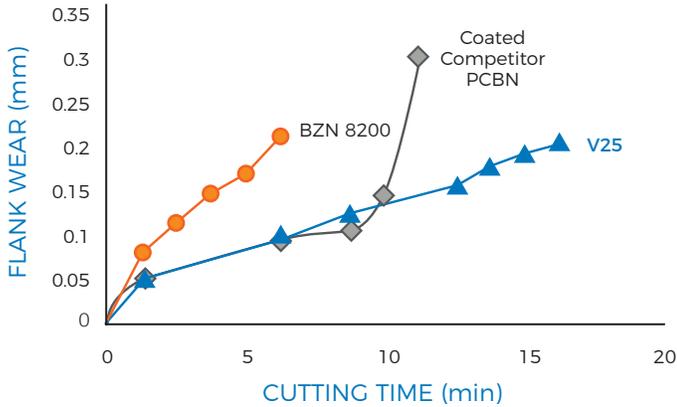
Grade	CBN Content (%)	Binder	CBN particle size (µm)	Hardness (Gpa)	Cutting Speed (m/min)	Feed Rate (mm/rev)	Depth of cut (mm)	Coolant	Edge Preparation (General)
V20	60 - 65	TiCN	2 - 3	30 - 32	100 - 175	0.05 - 0.2	0.05 - 0.3	Dry, Wet	S01025 0.1 mm x 25° light hone

To see size and availability, please visit [www.HyperionMT.com](http://www.HyperionMT.com).

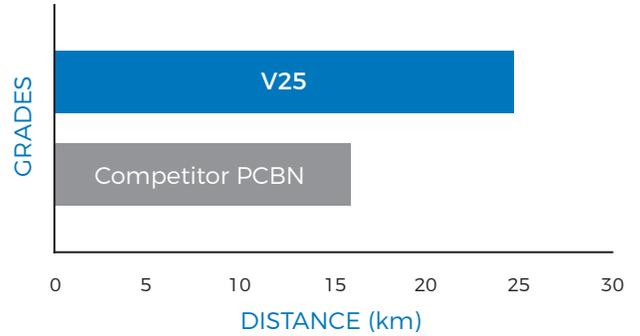
# BZN V25

## PCBN GRADE FOR HARDENED STEEL MACHINING

- Designed for continuous to medium interrupted applications
- Good flank and crater wear resistance at higher cutting speeds
- Superior edge toughness
- Suitable for both roughing and finishing cuts.



Work Material - 21NiCrMoS2, HRc 58-62  
 Insert CNGA120408  
 Vc = 200 m/min, ap = 0.15 mm, f = 0.2 mm/rev, dry

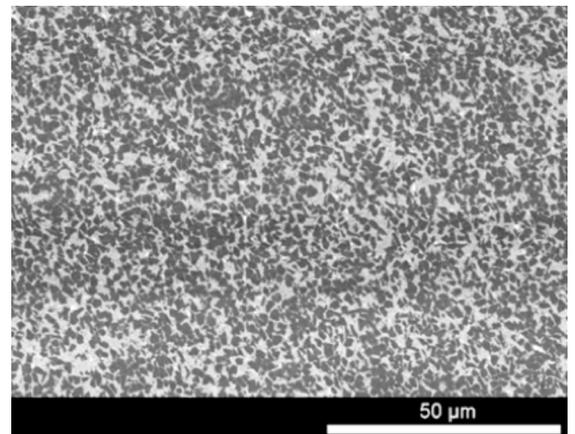
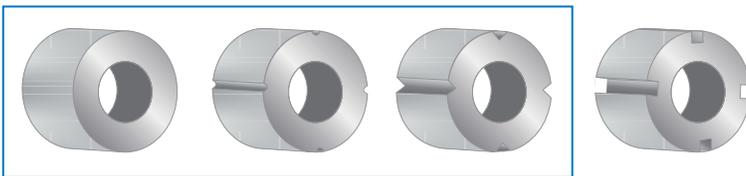


Work Material - 100Cr6, HRc 60-62  
 Interrupted turning  
 Vc = 160 m/min, ap = 0.2 mm, f = 0.15 mm/rev

## APPLICATIONS

BZN Grade V25 is recommended for:

- Medium interrupted turning
- Powder metal machining
- CV joint applications.



## GRADE SUMMARY

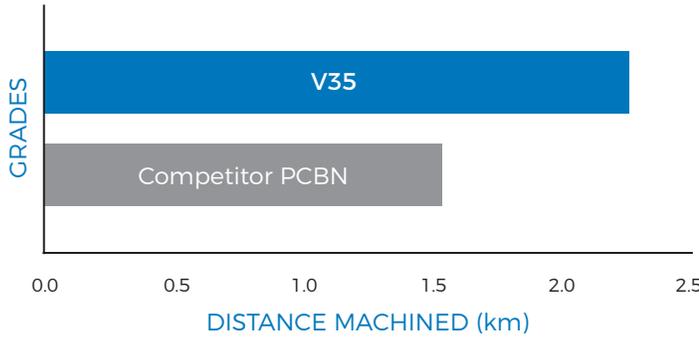
Grade	CBN Content (%)	Binder	CBN particle size (μm)	Hardness (Gpa)	Cutting Speed (m/min)	Feed Rate (mm/rev)	Depth of cut (mm)	Coolant	Edge Preparation (General)
V25	60 - 65	TiN	2 - 3	31 - 33	140 - 220	0.05 - 0.2	0.05 - 0.3	Dry	S01025 0.1 mm x 25° light hone

To see size and availability, please visit [www.HyperionMT.com](http://www.HyperionMT.com).

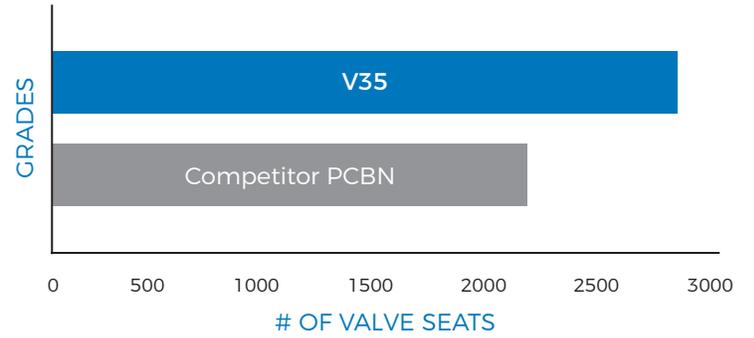
# BZN V35

## PCBN GRADE FOR HARDENED STEEL MACHINING

- Designed for mild to heavy interrupted applications
- Superior edge toughness
- Suitable for both roughing and finishing cuts.



Work Material - 100Cr6, HRC 60-62  
 Interrupted turning  
 $V_c = 160$  m/min,  $a_p = 0.2$  mm,  $f = 0.15$  mm/rev

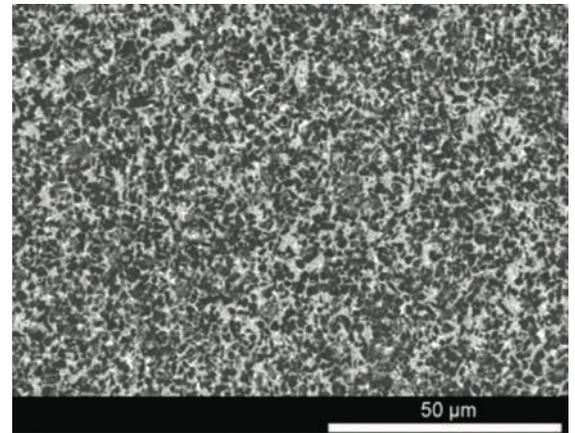
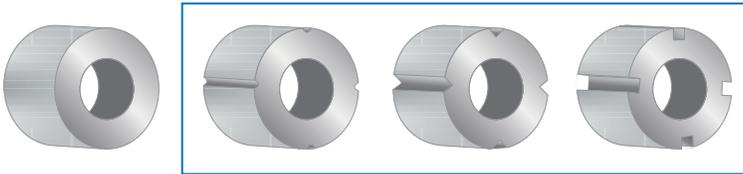


Powder Metal Valve Seat Machining  
 $V_c = 100$  m/min,  $f = 0.1$  mm/rev  
 Plunge cut

## APPLICATIONS

BZN Grade V35 is recommended for:

- Heavy interrupted turning
- Valve seat machining
- CV joint applications.



## GRADE SUMMARY

Grade	CBN Content (%)	Binder	CBN particle size (µm)	Hardness (Gpa)	Cutting Speed (m/min)	Feed Rate (mm/rev)	Depth of cut (mm)	Coolant	Edge Preparation (General)
V35	70 - 75	TiN	2 - 3	32 - 34	80 - 150	0.05 - 0.35	0.05 - 0.4	Dry	S01025 0.1 mm x 25° light hone

To see size and availability, please visit [www.HyperionMT.com](http://www.HyperionMT.com).

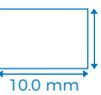
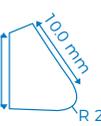
# CUTTING SERVICES

## HYPERION UTILIZES THE LATEST IN EDM TECHNOLOGY

Our service shop is capable of performing precision cutting services:

- Complete your cut order in **five** business days or less from the day the order is received.
- Each piece is cleaned and visually inspected to ensure you receive the highest level of quality and to minimize your internal processing time.
- Precision cutting of PCBN blanks includes standard shapes, customer special shapes, through holes, tight tolerance, relief angles and carbide chamfers.

### HYPERION NOMENCLATURE EXAMPLES

		LENGTH/ANGLE (mm/degree)	LEG LENGTH OR DIAMETER (mm)	OT	GRADE	SPECIAL*	DESCRIPTION
ROUND		360	58.0	1.6	6000		360R58.0/1.6-60
HALF ROUND		180	10.0	2.4	9500		180P10.0/2.4-95
PARTIAL		90	8.0	1.6	HPT130	0.5-0.8 PCBN	90P8.0/1.6-HPT130 0.5-0.8 PCBN
RECTANGLE		10.0	8.0	1.6	6000		10.0L8.0/1.6-60
TRIANGLE		60	5.0	3.2	HPT135		60T5.0/3.2-HPT135
CUSTOMER SPECIAL				1.6	6000		DXXXXXX/1.6-60
CHAMFER					9500	CHAMFER ON CARBIDE	DXXXXXX/1.6-95 CHF
HOLE		360	13	1.6	6000	HOLE 2 mm	360R13.0/1.6-60 HOLE 2mm

Standard cut product tolerance for PCBN

Leg length = ± 0.1 Diameter = ± 0.1 Thermal zone (chip spec) ≤ 0.10 mm Angle = ± 1° degree Thickness = ± 0.05 mm

All dimensions in mm.

\* Special = if not standard layer

To see size and availability, please visit [www.HyperionMT.com](http://www.HyperionMT.com).

