**BIDEMICS SERIES**

**JX1 / JX3**

JX1/JX3 are made of an advanced composite cutting tool material developed for machining Heat Resistant Super Alloys. JX1/JX3 are capable of running at speeds 2x greater than whisker ceramics. JX1/JX3 excel in notching resistance and wear resistance leading to significantly longer tool life. Also, JX1/JX3 produce superior surface finishes vs. whisker ceramics. JX3 grade brings a new level of toughness to the BIDEMICS family.

*Applications*
- Semi-finish & finish turning of HRSA materials
- Roughing (No scale) of HRSA materials

**JP2**

JP2 is an advanced composite cutting tool material developed for machining Heat Resistant Super Alloys. JP2 is brazed onto carbide for maximum strength. JP2 is designed for finishing at speeds up to 1700 SFM. This translates into 10-15 times faster cutting speeds than typical coated carbide in finishing applications. JP2 excels in notching resistance and wear resistance vs. carbide or CBN. As an added benefit, JP2 produces superior surface finishes vs. carbide or CBN.

*Applications*
- Finish turning of HRSA materials

**CERAMIC-SILICON NITRIDE SERIES**

**SX6, SP9**

SX6 & SP9 make high-speed machining productive and profitable. SX6 has the highest silicon nitride content on the market. SX6 excels in rough turning or milling of gray cast iron. CVD coated SP9 has a unique combination of wear resistance and toughness which enables the use of smaller T-lands. Sharper edges reduce tool pressure. This feature makes SP9 the best choice for finishing gray cast iron and rough turning and milling of ductile cast irons.

*Applications*
- Rough and finish turning / milling of gray cast iron (SX6)
- Rough and finish turning / milling of ductile cast iron (SP9)

**SX3, SX5, SX7, SX9**

SX3, SX5, SX7 & SX9 are SiAION ceramics used for high-speed machining of nickel-based alloys. SiAION ceramics offer better notching resistance and are tougher than whisker based ceramics. SX5 is the toughest grade for machining through scale or interruptions. SX9 has added wear resistance needed for turning or milling of HNBA. SX7 offers better flank wear resistance compared to other SiAION’s. SX3 has the best combination of wear resistance and toughness to apply wide range of HRSA applications.

*Applications*
- Rough and finish turning HRSA materials
- Grooving HRSA materials
- Milling of HRSA materials
## CERAMIC-ALUMINA SERIES

### HC1, HW2 Al₂O₃ Type

HC1 is a pure (Al₂O₃) alumina white ceramic. It’s highly dense and fine grain structure improves wear resistance, tool life and toughness. HW2 is similar to HC1, but much tougher. Both grades are best suited for high cutting speeds with no coolant.

**Applications**
- Finish turning and boring of gray cast iron (~ 3000 SFM)
- Semi-rough and finished cylinder liner materials
- Tube scarfing

### HC2, HC5, HC7, ZC4, ZC7 Al₂O₃ + TiC Type

These grades of ceramic consist of properly proportioned aluminum oxide and titanium carbide (Al₂O₃+TiC) sintered under pressure. The resulting products are stable over a vast range of machining conditions. HC2 is a general purpose ceramic. HC7 (ZC7-TiN coated version) is a premium grade for hard turning in steel rolls. (TiN) coated ZC4 has the finest grain structure which is best suited for hard turning steel applications. (HRC 50-65) vs CBN.

**Applications**
- Finish turning and boring of gray cast iron
- Turning of hard materials (HRC 40-65)

### HC6 TiC + Al₂O₃

HC6 is a unique (TiC) ceramic composite material. This grade is specifically designed to machine ductile cast iron. HC6 demonstrates superior wear resistance at high speeds. As an added benefit, this ceramic produces excellent surface finishes. HC6 toughness and thermal shock resistance surpass (Al₂O₃+TiC) ceramics. HC6 can be run with or without coolant.

**Applications**
- Semi-finish and finish turning of ductile cast iron
- High speed cutting of gray cast iron

### WA1 Al₂O₃ + SiC Type

WA1 is a whisker-reinforced ceramic material with Silicon-Carbide (SiC) whiskers added to alumina. WA1 machines HRSA at high cutting speeds and hardened steels with interruptions. WA1 has a higher (SiC) content than other competitor’s whisker-reinforced ceramics. The resulting material, WA1, shows increased productivity and extended reliability in applications where both toughness and notching resistance are needed.

**Applications**
- Rough and finish turning HRSA
- Milling of HRSA
- Turning of hard materials with interruptions
- Milling of hard steels (HRC 50-62)
**CBN SERIES**

**CBN**

B23, B30, B36, B40, B52 grades are composite CBN (Cubic Boron Nitride) materials. They exhibit high hardness characteristics, the same as ceramics, allowing high speed cutting with maximum efficiency. These five CBN grades cover a variety of applications from turning hardened steels to high speed machining of cast irons. Many geometries have multiple cutting edges.

B5K, B6K grades are composite CBN materials with a TiCN coating. This coating makes edge wear easily detectable. B99 grade is a solid CBN material. Ideal for harder mill roll machining.

**Applications**
- Turning of steels (HRC60), Turning of gray cast iron
- Finish milling of gray cast iron, Rough turning of steel mill rolls

**PCD SERIES**

**PD1, PD2**

PD1 is a fine grain (10μm) PCD (Polycrystalline Diamond) grade designed for turning and milling of aluminum and nonferrous materials. PD1 enables high precision and stable machining by controlling built-up edge. PD1 photo not shown. PD2 is a super fine grain (1μm) PCD grade designed with sharp cutting edges and increased chipping resistance. PD2 has ground in chipbreakers that provide excellent chip control on aluminum and nonferrous materials.

**Applications**
- Turning and milling of aluminum, Turning and milling of nonferrous material
- Various Swiss Tooling geometries

**UC1**

UC1 is an ultra fine diamond grain (<0.1μm) coated grade designed for turning of aluminum, copper, and carbon materials. The purity and hardness of the fine particle coating provides better wear resistance to past PCD tooling. A good coating adherence provides stable cutting and long tool life.

**Applications**
- Rough to Finish turning of aluminum, nonferrous material, copper, and carbon
- Various Swiss Tooling geometries

**MICRO-GRAIN CARBIDE SERIES**

**MICRO-GRAIN CARBIDE**

NTK’s micrograin carbide has been developed by reducing the size of WC hard grains, to about 1μm. This process results in a tougher and harder carbide with sharp cutting edges. Various compositions and coatings have been developed to handle all the demanding small part applications on Swiss lathes.

**Applications**
- Rough and finish turning, cut-off, grooving, threading, boring and milling of all materials
<table>
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<tr>
<th>Grade name / Coating type</th>
<th>Recommended applications</th>
<th>Applications map</th>
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| ST4 Micro-grain carbide + Thick CrAlN coat | • Excellent adhesion and wear resistance.  
• For stainless steel especially 304 SS. | ![Correlation chart 1](image) |
| QM3 Micro-grain carbide + Thick TiCN coat | • Excellent toughness and wear resistance.  
• For stainless, steel, high-nickel alloys and abrasive materials. Demanding applications (such as grooving and interrupted cuts).  
• 1st recommendation for most Swiss machining applications. | ![Correlation chart 2](image) |
| DT4 Micro-grain carbide + Thin TiN-TiC-TiAIN coat | • Excellent oxidation and heat resistance with sharp cutting edges.  
• For high-speed turning of titanium alloys, stainless, steel, high-nickel alloys and hardened materials. | ![Correlation chart 1](image) |
| DM4 Micro-grain carbide + Thick TiN-TiC-TiAIN coat | • Best oxidation and heat resistance combined with toughness.  
• For high-speed turning of stainless steels, high-nickel alloys and hardened materials. | ![Correlation chart 2](image) |
| TM4 Micro-grain carbide + Thin TiN-TiC-TiAIN coat | • Exceptionally smooth coating surface to minimize adhesion. Well-balanced combination of wear resistance, toughness and sharp cutting edges.  
• For titanium, nonferrous materials (including plastic), stainless and steel. | ![Correlation chart 1](image) |
| VM1 Micro-grain carbide + Thin TiCN coat | • Excellent wear resistance and sharp cutting edges.  
• For titanium, nonferrous materials (including plastic), stainless, steel, rare metals (including platinum) and small parts applications. | ![Correlation chart 2](image) |
| ZM3 Micro-grain carbide + Thick TiN coat | • Best selling PVD TiN coated grade with exceptional versatility and smooth coating layer. |  |
| KM1 Micro-grain carbide | • Precision ground and polished to mirror-finish with extremely sharp cutting edge.  
• For aluminum and nonferrous materials. |  |
| CP1 Carbide + Thick film Al2O3-TiCN coat | • Good balance of wear resistance and toughness for cast iron machining. |  |
| AC3 Micro-grain carbide + Thin TiACrN-TiAIN coat | • Developed for solid carbide endmill. |  |
| UC1 Micro-grain carbide + Diamond coat | • Pure and hard diamond coating. |  |
• Ceramics and CBNs

• Tooling For Swiss Type Lathes

• Steel Machining

• High Speed Machining of Aluminum