

NTK CUTTING TOOLS

Product Guide



Specialists In The World of Ceramics

INSERT GRADE INFORMATION

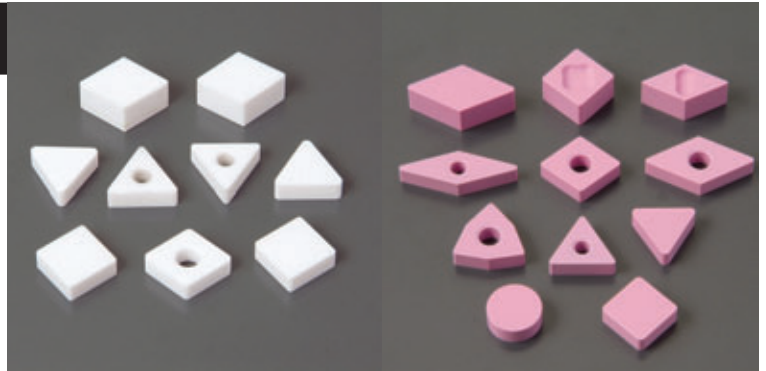
CERAMIC SERIES

HC1, HW2 Al_2O_3 Type

- HC1 is a HIP (Hot Isostatic Press) processed highly pure (Al_2O_3) alumina white ceramic. This sintering process results in a highly dense and fine grain structure which improves wear resistance, tool life and toughness. HW2 is similar to HC1. Use HW2 in applications where increased toughness is required.

Applications

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

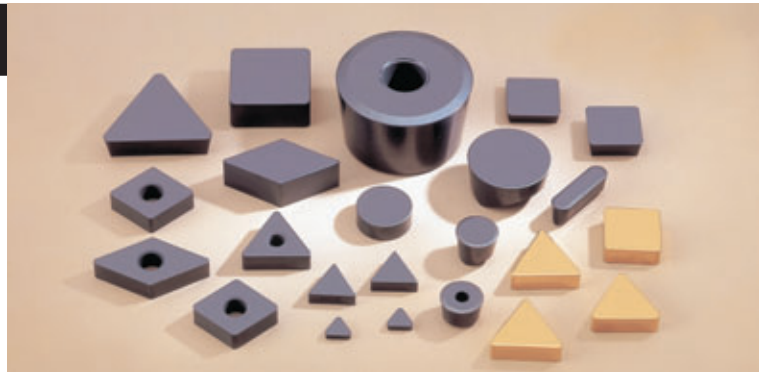


HC2, HC5, HC7, ZC4, ZC7 Al_2O_3 TiC Type

- These grades of ceramic consist of properly proportioned aluminum oxide and titanium carbide ($\text{Al}_2\text{O}_3 + \text{TiC}$) 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 mills. 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 (under HRC65)



HC6 TiC Type

- 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 ($\text{Al}_2\text{O}_3 + \text{TiC}$) 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
NOTE: HC6 can now be made with a hole (not shown)

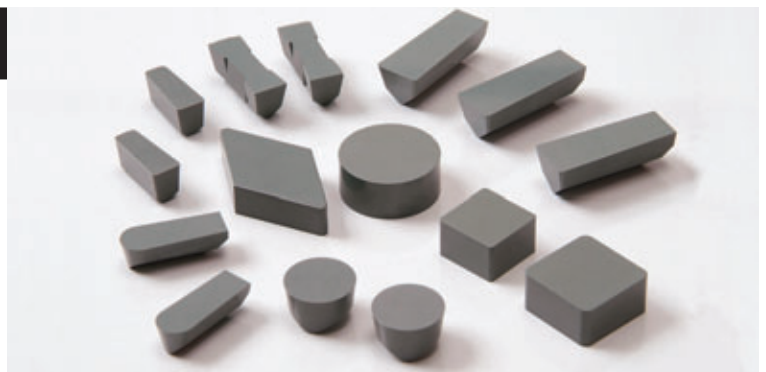


WA1 Al_2O_3 -TiC Type

- WA1 is a whisker-reinforced ceramic material with silicon-carbide (SiC) whiskers added to alumina. WA1 machines high temperature alloys 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 Ni-based alloys
Milling of Ni-based alloys
Turning of hard materials with interrupted cut
Milling of hard materials. (HRC 50-62)



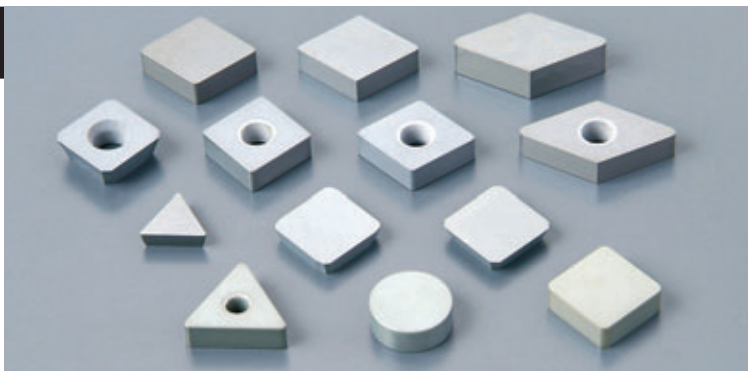
SILICON NITRIDE SERIES

SX1, SX6 Si_3N_4 Type

- SX1 and SX6 make high-speed machining of cast iron possible. SX1 and SX6 grades have the highest silicon nitride content on the market. Both grades offer exceptional thermal shock resistance and wear resistance at high cutting speeds. SX6 is the toughest silicon nitride grade for high-speed machining of cast iron. Use SX6 in interrupted applications where insert breakage may occur. SX1 can be used in machining ductile cast irons.

Applications

Rough and finish turning of gray cast iron
Milling of gray cast iron

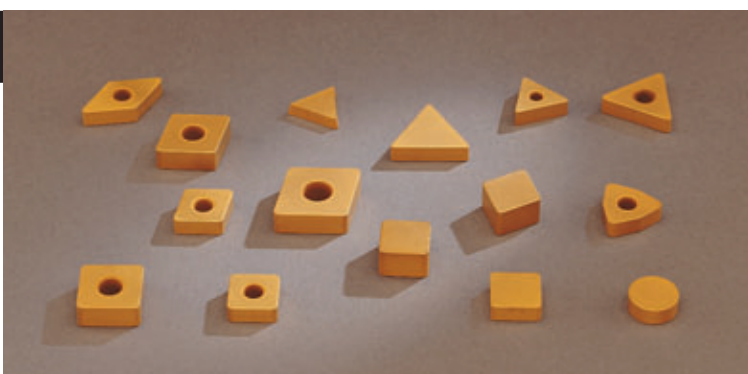


SP9 Si_3N_4 Type

- CVD coated SP9 silicon nitride ceramic has a unique combination of wear resistance and chipping resistance. These features enable the use of smaller T-lands. The result is longer tool life for roughing and finishing of gray or ductile cast irons. The gold coating makes edge wear easily detectable. Best grade for milling ductile cast iron.

Applications

Rough and finish turning of ductile and gray cast irons
Can be used for heavy interruptions - ***no coolant***



SX5, SX9, SX7 SiAlON Type

- SX5, SX9 & SX7 are SiAlON ceramics used for high-speed machining of nickel-based alloys. SiAlON 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 has the highest combined wear resistance and toughness of all the SiAlON's.

Applications

Rough and finish turning Ni-based alloys
Milling of Ni-based alloys



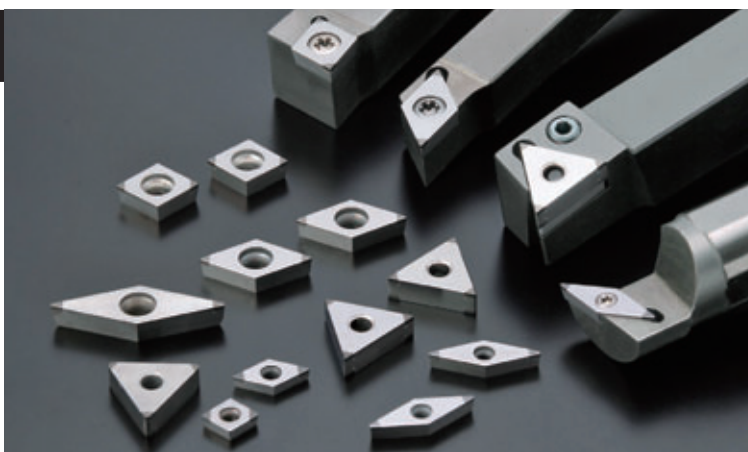
CUBIC BORON NITRIDE

B23, B30, B36, B40, B52 CBN Type

- 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 high efficiency. The five CBN grades cover all types of applications from turning hardened steels to gray cast irons and have multiple cutting edges.

Applications

Turning of steels (HRC60) and gray case iron
Finish milling of gray cast iron



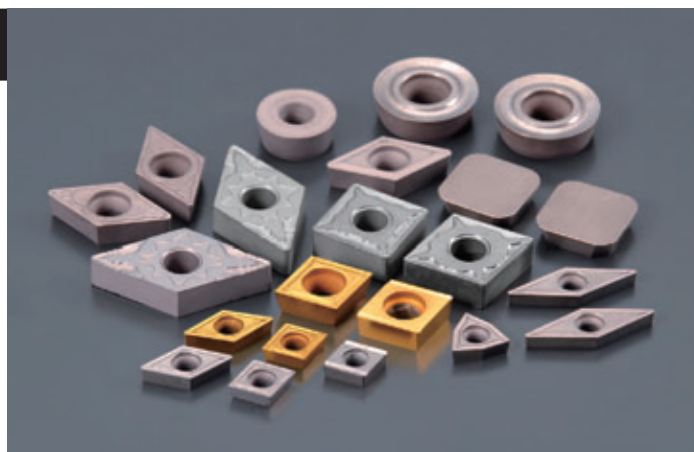
CERMET SERIES

C7X, C7Z, XT3, Q15, XN4

All the cermet grades are composed of different combinations of (TiC) and (TiN). Cermets are solid composite materials so chipbreakers can be ground into the various geometries. All grades are suitable for a wide range of finish and semi-finish applications. XT3 and Q15 (TiCN coated version) are the best general purpose cermet with the widest selection of chipbreakers. C7X and C7Z (TiN coated version) has the best fracture toughness comparable to some carbides on the market.

Applications

Semi-finish & finish of cast iron, steel and stainless steel
Form inserts for bearing industry
(C7X) milling of steel and stainless steel



MICRO GRAIN CARBIDE SERIES

Micrograin Carbide

NTK's micro-grained carbide has been developed by reducing the size of WC hard grains, which is the main component of cemented carbide, to about 1µm. This process results in added toughness and hardness needed to maintain sharp cutting edges. Various compositions and coatings have been developed to handle all the demanding applications involved in making small parts on Swiss lathes.

Applications

Rough and finish turning, cut-off, grooving, threading, boring and milling of all materials.



GRADE NAME	COATING TYPE	COLOR	RECOMMENDED APPLICATIONS
QM3	PVD TiCN (Thick)	Silver	Excellent toughness and wear resistance For stainless, steel, high-nickel alloys, abrasive materials. Demanding applications (such as grooving and interrupted cut). 1st recommendation for most Swiss machining applications.
VM1	PVD TiCN (Thin)	Silver	Excellent wear resistance and sharp cutting edges For titanium, non-ferrous materials (including plastic), stainless, steel Rare metals (including platinum), small parts applications
NEW TM4	PVD Multilayer TiN-TiCN	Gold	Exceptionally smooth coating surface to minimize adhesion. Well-balanced combination of wear resistance, toughness and sharp cutting edges For titanium, non-ferrous materials (including plastic), stainless, steel
NEW DT4	PVD Multilayer (Thin) TiN-TiCN-TiAlN	Bronze	Excellent oxidation and heat resistance with sharp cutting edges For high-speed turning of titanium alloys, stainless steels, high-nickel alloys, hardened steels
NEW DM4	PVD Multilayer (Thick) TiN-TiCN-TiAlN	Bronze	Best oxidation and heat resistance combined with toughness For high-speed turning of stainless steels, high-nickel alloys, hardened steels.
ZM3	PVD TiN	Gold	Best selling PVD TiN coated grade with exceptional versatility and smooth coating layer. Applicable to most applications except for high-speed machining.
KM1	Uncoated	Silver	Precision ground and polished to mirror-finish and with extremely sharp cutting edge. For aluminum, non-ferrous materials.

NEW CERAMIC GRADE

NEW SiAlON CERAMIC GRADE SX7

- SX7 is the newest silicon nitride ceramic for machining high nickel based alloys. SX7 becomes NTK's fourth ceramic grade specifically developed for aerospace machining. SX7 is a less expensive alternative to the high cost of whisker ceramics.

Features

Better notching resistance compared to whisker ceramics
No need to program ramping like whisker material
Ability to increase feeds for increased productivity
Better flank wear resistance compared to competitors

Applications

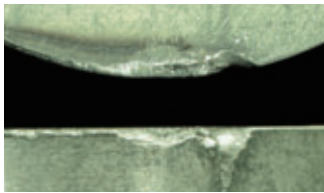
Semi-finish turning, profiling & milling



Recommended Materials

Inco 718, Inco 625, Waspaloy, Udimet 720

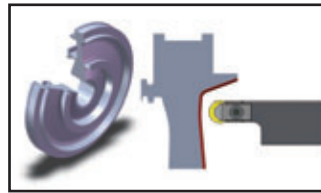
Profiling of Inco 718



Competitor's Whisker Ceramic



SX7



Turbine Disk

Tool Life: 4.5min
RCGX45, 800sfm .006ipr, .040", Wet
RCGX120700, 240m/min, 0.15mm/rev, 1.00mm, Wet
Inco 718 (pre-machined)

NTK TOOLING SYSTEM FOR SWISS LATHES



Features:

- High precision ground inserts
- Sharp cutting edges for reduced tool pressure
- Excellent chip control design
- Strong stable clamping system for maximum rigidity
- Micro-grain carbide grades specially designed for high-precision applications

See more detail on the web:

www.ntkcuttingtools.com/swiss



Front Turning



Threading



Back Turning



Cut-Off



Grooving



Indexable Endmills

NEW SWISS TOOLING PRODUCTS

DS-ACH



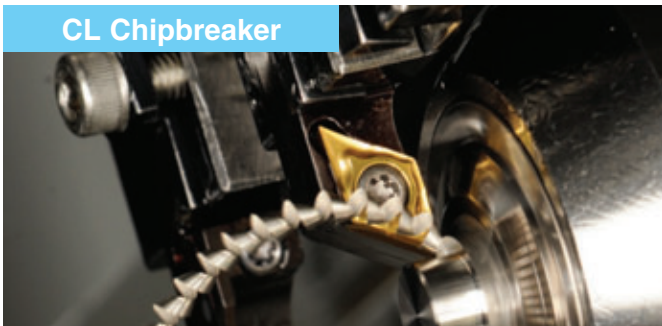
Adjust centerline height simply with a wrench

SATURN DUO



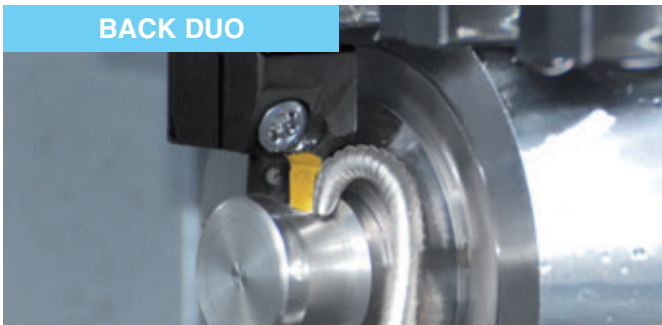
Face grooving tools specialized for small parts

CL Chipbreaker



Excellent chip control regardless of cutting conditions

BACK DUO



No-compromise quality back turning tools. Guaranteed.

STICK DUO HYPER



Double-ended solid carbide bars. Hassle-free indexing.

CUT DUO



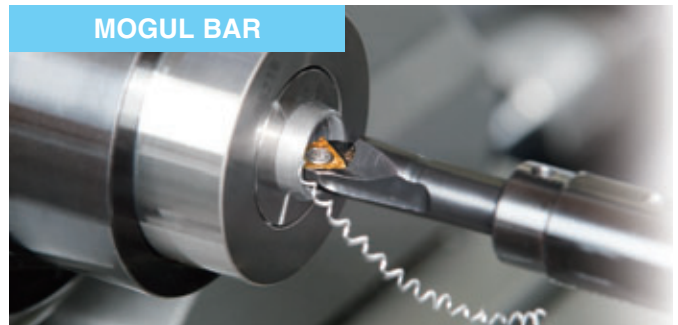
Looks conventional but unconventionally sharp and tough

Thread Whirling



Make high precision threads in a SINGLE pass

MOGUL BAR



Coolant-through, extremely rigid, excellent chip control



NTK Cutting Tools

Division of NGK Spark Plugs USA
46929 Magellan Drive
Wixom, MI 48393 U.S.A.
Phone: 248-668-0100 • Fax: 248-668-0200
Toll Free: 866-900-9800

www.ntkcuttingtools.com
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