



CAUTION

Safety Notes of Cutting Tools

1. Introduction

Kyocera has put "caution" or "warning" label on the package of cutting tool product, but it is not put on the tool itself. The following information is provided to be read before the use of the tool so that the tool is handled properly and safely.

2. Basic Information of Cutting Tool Material

1) Technical Terms

Cutting Tool Material : General term of tool material, such as Cemented Carbide, Coated Carbide, Cermet, Coated Cermet, Ceramics, CBN and PCD

Carbide Material : Cemented Carbide with WC (Tungsten Carbide) as the main ingredient

2) Physical Property

Appearance : Depends on materials. (e.g. Gray, Black, Gold, etc.)

Smell : None

Hardness : Carbide and Cermet: 5 - 30GPaHV, Ceramics: 10 - 40GPaHV, CBN: 20 - 50GPaHV,
PCD: 80 - 120GPaHV

Sp. Gr. : Carbide: 9 - 16, Cermet: 5 - 9, Ceramics: 2 - 7, CBN / PCD: 3 - 5

3) Composition

Carbide, Nitride, Carbon-nitride and Oxide with W, Ti, Al, Si, Ta, B, etc. and metals of Co, Ni, Cr, Mo, etc

3. Notes for Handling Cutting Tool Material

- These cutting tool materials are very hard but brittle. They may be broken by shock or excessive clamp force.
- Carbide base materials, in particular, can be very heavy. Handle with care when transferring and storing.
- When brazing the cutting tool material, use the proper temperature to prevent the tool from breaking.

4. Notes for Using Cutting Tools

- The cutting edge is very sharp; wear gloves when handling or installing tools to prevent injury.
- When machining, cutting tools may be broken due to shock, excessive tool wear or improper conditions. Use protective materials such as safe guards, safety eyeglasses, and gloves to prevent injury.
- Depending on workpiece material and cutting conditions, sparks or fire may occur. Use protective material such as safe guards, safety eyeglasses and gloves.
- When machining, flying chips or metal pieces may be dangerous. Use protective materials such as safe guards and safety eyeglasses to prevent injury.



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Precaution for using cutting tools

Items	Precariousness	Counter measures
General Cutting Tools	⊙ Direct touch to a sharp cutting edge may cause injury.	* When you set up tools to the machine or take tools out of the case, please wear protective gloves.
	⊙ Misuse or inappropriate working conditions may cause tool breakage or dispersion of broken pieces.	* Please use safety items, such as safety glasses and protective gloves. * Please use safety goods in the area of our recommended cutting condition. See our catalog or instruction manuals.
	⊙ Excessive impact or heavy wear will increase cutting resistance and may cause tool breakage and dispersion of broken pieces.	* Please use safety items, such as safety glasses and protective gloves. * Early exchanging tools is preferable.
	⊙ Dispersion of hearted or prolonged chips may cause injury or burn.	* Please use safety items, such as safety glasses and protective gloves.
	⊙ During cutting operation, cutting tools generate high heat. Direct touch to tools shortly after machining may cause burn.	* Please prepare safety items, such as safety glasses and protective gloves.
	⊙ Sparks, generation of heat or chips in high temperature during operation may cause fire.	* Please do not operate around Hazardous zone, in which there is some possibility of fire or explosion. * In case of using oil-coolant, please be sure of enough system for fire-prevention.
	⊙ Lack of dynamic balance in high-speed revolution cause tool-broken by vibration.	* Please prepare safety items, such as safety glasses and protective gloves. * Please conduct test-operation before cutting, and confirm that there is no vibration or unusual sound.
	⊙ Direct touch to burrs which were generated on the rough surface of the workpiece may cause injury.	* Do not touch workpiece with bare hand.
Indexable Cutting Tools	⊙ If inserts or parts are not installed well, falling off or dispersion may occur and cause injury.	* Please clean up insert pockets or clamping parts before setting insert. * Please set up inserts with supplied wrench only, and confirm that the inserts or parts are clamped completely.
	⊙ If inserts are clamped too tightly by supplementary tools like pipe etc, inserts or body may be broken.	* Please set up with only supplied wrench.
	⊙ When inserts are used in high-speed revolution or parts may burst out of the body due to centrifugal force.	* Please use within recommended usage range. Please refer our catalog or instruction.
Milling Cutters and other Milling Tools	⊙ Since milling cutters have sharp edges, direct contact with bare hands may cause injury.	* Please use safety items, such as safety glasses and protective gloves.
	⊙ If a cutter lacks balance, tools would cause vibration and it may cause injury by dispersion of broken pieces.	* Please use in the range of our recommended machining condition. * Rotating portion and balancing should be checked regularly to prevent from eccentric rotation or run out due to wear of bearing portion.
Drill	⊙ When drilling through hole with running work, a disc sometimes flies out from the end of drilling with high speed. This is very dangerous since the disc has sharp edge.	* Please prepare safety items, such as safety glasses and protective gloves. Also attach covers on chuck part.
Brazed Tools	⊙ Dispersion of broken inserts or falling off may cause injury.	* Please check chips are brazed firmly. * Please do not use brazed tools in the condition that requires high cutting temperature.
Others	⊙ If brazing is carried out many times, the strength of carbide insert is deteriorated and becomes easy to be broken during cutting.	* Please do not use tools which are brazed several times. Since tool strength have been deteriorated.
	⊙ It is dangerous to use tools except for the fixed application. It may damage tools and machines.	* Please keep recommended usage of tools.