

How to select a knife

The long-period sustainability of sharpness and rigidity overcoming the object to be cut are required of knives for cutting machines. In general, high-speed steel and ultrafine grain cemented carbide are widely used for knives, and select knives with the types and properties of objects to be cut taken into account in order to achieve distinguished productivity and fine finished quality of objects to be cut.

High-speed steel (SKH2)

Knives made of high-speed steel are most widely used, standard knives today. They are compatible with all paper quality grades, but they are likely to cause an overcut phenomenon in cutting of hard paper, and the knife edge angle must be set with care.

Ultrafine grain cemented carbide, super ultrafine grain cemented carbide

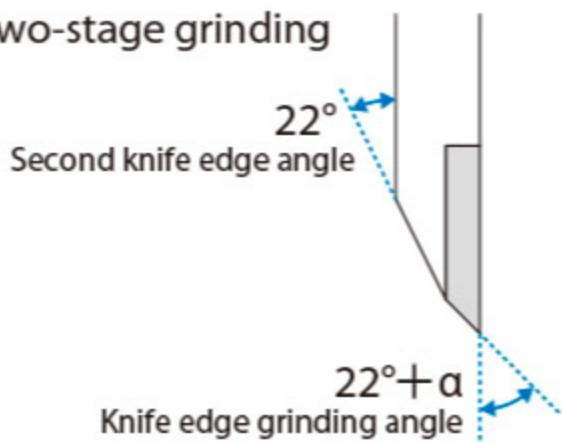
Knives made of ultrafine grain cemented carbide and super ultrafine grain cemented carbide are lower in the incidence of cutting problems than knives made of high-speed steel and suitable for cutting of art paper and coated paper, in particular.

Although the purchasing prices and regrinding costs of knives made of ultrafine grain cemented carbide and super ultrafine grain cemented carbide are much higher than those of knives made of high-speed steel, they offer the advantage of wear resistance or a reduced knife replacement frequency.

Grinding

The false edge face is ground with a ring grindstone, and the knife edge is lapped to an angle 1° to $1^\circ 30'$ larger than the first knife edge angle. A knife to be ground may cause bending due to the grinding heat to which it is exposed. It is necessary to keep the amount of grinding from increasing by grinding the knife early or preventing knife edge chipping.

Two-stage grinding



In the case of knives applied with Teflon coating for preventing the adhesion of the glue during cutting of tack paper, only the knife edges are sometimes ground, and in this case, two-stage grinding is adopted.

Setting of knife edge angle and pressure

In general, knives made of high-speed steel for paper cutting machines have a standard knife edge angle of 22° , which is relatively large for cutting of woodfree paper but can also cut art paper and coated paper. Set an appropriate knife edge angle for a paper quality grade only when the paper quality grade can be fixed and used. Two-stage grinding is suitable for hard materials, such as films and PS panels.

Knives made of ultrafine grain cemented carbide can cut all paper quality grades, except for specialty paper, boards, and pressure sensitive paper, by setting the knife edge angle to 20° and the clamp pressure to about 3 tons. To cut specialty paper and boards with these knives, use them after the knife edges are worn and can no longer cut other paper quality grades. However, if soft paper quality grades etc. are deformed and a clamp mark is left on them, reduce the clamp pressure.

Examples of appropriate knife edge angles and clamp pressure settings for paper quality grades (standard for knives made of high-speed steel)

Paper quality grade	Paper type (classification based on paper quality grades)	Knife edge angle	Clamp pressure
Soft paper grade	Tissue paper, copy paper, type paper, 5 leaf, rice paper, machine glazed paper, India paper, Komagami, bank paper	19 ~ 20°	2 ~ 3 t
Woody paper and wood containing paper grades	Woody paper, wood containing paper, kraft paper, machine glazed kraft paper, bleached kraft paper, Olympus, unbleached kraft paper, bag making paper, woodfree stencil printing paper, blotting paper, cushion paper, drawing paper, Kony Wrap paper, Hosho-shi	22°	3 t
Woodfree paper grade	Tag paper, ledger paper, book paper, kent paper, PPC paper, form paper, colored woodfree paper, Prene DX, Easter DX	22°	3 t
	Woodfree paper 45 to 70 kg	18 ~ 19°	3 t
	Woodfree paper 90 kg or over	22°	3 t
Intermediate paper grade	Thin simili paper, TLP, tracing paper	23°	3 t
Hard paper grade	One-sided/two-sided art paper, cast-coated paper, woodfree coated paper, wood containing coated paper, comland paper, coated paper, art post, machine glazed and coated, PES gloss coated paper, ML fiber, fancy coated paper, mirror coated paper	23 ~ 24°	3 ~ 4 t
Board grade	Machine glazed board, furyu sand, KV paper, A Manila, branche, astor, ivory, Karmen W, A card, Ten Color	24°	3 ~ 4 t
	Yellow straw paper, chip board, kraft board		

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Specialty paper grade	Cellophane, glassine	25° or more	3 t
Synthetic paper grade	YUPO, styrene-based, Tyvek	23°	3 t
Pressure sensitive paper grade	Top sheet	22°	2 t or less
	Middle sheet (Use a cushion material to prevent color development.)	22°	0.8 ~ 1.2 t
	Bottom sheet	22°	3 t
Carbon paper grade		22°	2 t
Converting paper grade	Muse Cotton, Angle Color, Araragi, Lezak, Pecker, Wooke, Emboss Art	23°	3 t
	Araragi, Crepe N Series	22°	1.8 ~ 2 t
Washi grade		19°	0.4 ~ 1.8 t

«The standard lapping angle is 1° larger than the knife edge angle.»

The values shown in this table are based on unprinted paper.

Data provided by: Shigeyoshi Terada, cutting instructor

Limit of use of knives

