

Comparison Chart of the chemical components and characteristics used in the material

Classification	Matching Standard		Main Chemical Components (%)							Comparison of characteristics			Actual Hardness	Applications
	JIS	AISI	C	Cr	Mo	W	V	Co	Ta Ti Nb	Abrasion resistance	Heat resistance	Toughness		
High Speed Steel	SKH51	M2	0.85	4	5	6	2						HRC 64 ∩ 66	Cutting standard material, requiring toughness
	SKH55	M35	0.90	4	5	6	2	5					65 ∩ 67	Cutting heavy duty material, requiring toughness
	SKH59	M42	1.10	4	9.5	1.5	1	8					66 ∩ 68	Cutting heavy duty material, requiring toughness at high speed
	MPM (Powder high speed steel)		1.30	4	5	6	3	8					66 ∩ 68	Cutting super hard to machine material
Carbide Grades	K10		5 ∩ 6			84 ∩ 90		4 ∩ 7	0 ∩ 3				HRA 92.0	For cutting hard material that is required wear and abrasion resistance and heat resistance.
	K20		5 ∩ 6			83 ∩ 89		5 ∩ 8	0 ∩ 3				91.0	For cutting hard material that is required toughness against chipping.
	Z10	Micro grain carbide	5 ∩ 6			76 ∩ 89		5 ∩ 15	0 ∩ 3				92.0	

Carbide grades recommendation

JIS	Performance range	Actual hardness	Features / Applications
K10	Abrasion resistance	HRA 92.0	Used for standard cutting of irons. It also lasts longer than other carbide grades for steel cutting when intermissive wet-milling of steel, sensitive feed, and grooving shallow depth.
K20	Toughness	91.0	Best used when cutting non-ferrous metals in which small wedge angle and toughness is required.
Micro grain carbide	Abrasion resistance	92.0	The alloys used ultrafine powder of WC below 1.0 μm. Best used when cutting requires sensitive feed, thin shallow of grooving, and high precision at low speed. Toughness is retained even though it keeps the hardness of the normal carbides because of micro structure. Best fit for precision machining of tools with small diameter and thickness.
	Toughness	91.0	
Impact resistance	Abrasion resistance	88.0	The alloys used medium and coarse powder of WC. Best used for the processing that needs the characteristic that is toughness, impact resistance.
	Toughness	87.0	

※Please inquire about excluding the above kind of material.