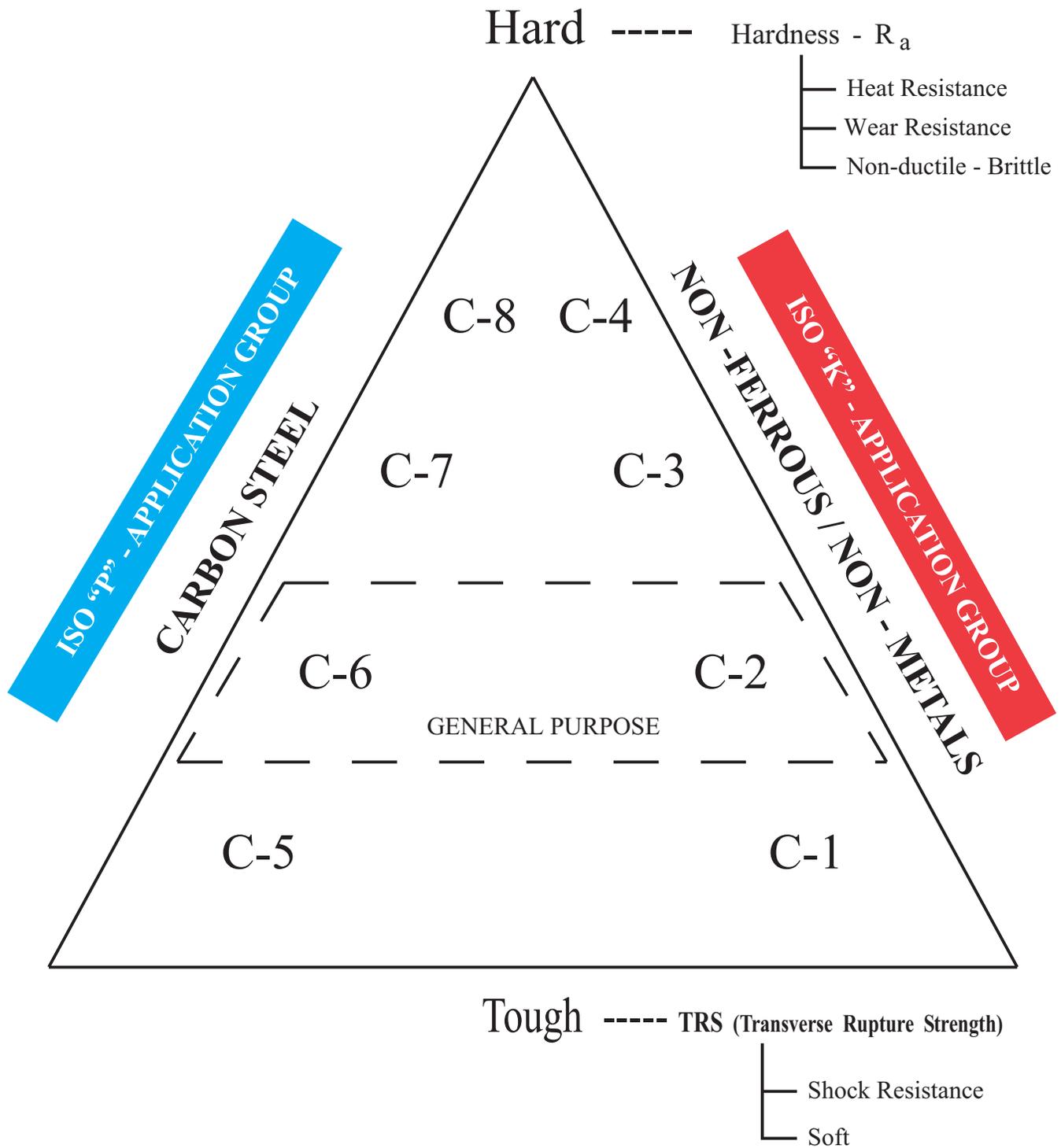


Ultra-met Application Chart



Ultra-met Application Chart

Main groups of chip removal			Groups of application		Direction of increase in characteristic		
Symbol	Broad categories of material to be machined	Distinguishing colors	Designation	Material to be machined	Use and working conditions	of cut	of hard cutting materials
P	Ferrous metals with long chips		P01	Steel, steel castings	Finish turning and boring, high cutting speeds, small chip section, accuracy of dimensions and fine finish, vibration-free operation	← Increasing feed	← Toughness
			P10	Steel, steel castings	Turning, copying, threading and milling, high cutting speeds, small or medium chip sections		
			P20	Steel, steel castings, malleable cast iron with long chips	Turning, copying, milling, medium cutting speeds and chip sections, planing with small chip sections		
			P30	Steel, steel castings, malleable cast iron with long chips	Turning, milling, planing, medium or low cutting speeds, medium or large chip sections, and machining in unfavorable conditions 1)		
			P40	Steel, steel castings with sand inclusion and cavities	Turning, planing, slotting, low cutting speeds, large chip sections with the possibility of large cutting angles for machining in unfavorable conditions 1) and work on automatic machines		
			P50	Steel, steel castings of medium or low tensile strength, with sand inclusion and cavities	For operations demanding very tough hard cutting materials: turning, planing, slotting, low cutting speeds, large chip sections, with the possibility of large cutting angles for machining in unfavorable conditions 1), and work on automatic machines		
M	Ferrous metals with long or short chips and non-ferrous metals		M10	Steel, steel castings, manganese steel, grey cast iron, alloy cast iron	Turning, medium or high cutting speeds, small or medium chip sections	← Increasing speed	← Wear resistance
			M20	Steel, steel castings, austenitic or manganese steel, grey cast iron	Turning, milling: medium cutting speeds and chip sections		
			M30	Steel, steel castings, austenitic steel, grey cast iron, high temperature resistant alloys	Turning, milling, planing: Medium cutting speeds, medium or large chip sections		
			M40	Mild free-cutting steel, low-tensile steel, non-ferrous metals and light alloys	Turning, parting off, particularly on automatic machines		
K	Ferrous metals with short chips, non-ferrous metals and non-metallic materials		K01	Very hard grey cast iron, chilled castings of over 85 Shore, high-silicon aluminum alloys, hardened steel, highly abrasive plastics, hard cardboard, ceramics	Turning, finish turning, boring, milling, scraping	← Increasing speed	← Wear resistance
			K10	Grey cast iron over 220HB, malleable cast iron with short chips, hardened steel, silicon aluminum alloys, copper alloys, plastics, glass, hard rubber, hard cardboard, porcelain stone	Turning, milling, drilling, boring, broaching, scraping		
			K20	Grey cast iron up to 220HB, non-ferrous metals: copper, brass, aluminum	Turning, milling, planing, boring, broaching, demanding very tough hard cutting materials		
			K30	Low-hardness grey cast iron, low-tensile steel, compressed wood	Turning, milling, planing, slotting, for machining in unfavorable conditions 1) and with the possibility of large cutting angles		
			K40	Soft or hard wood, non-ferrous metals	Turning, milling, planing, slotting, for machining in unfavorable conditions 1) and with the possibility of large cutting angles		

1) Raw Material or components in shapes which are awkward to machine: casting or forging skins, variable hardness etc. Variable depth of cut, interrupted cut, work subject to vibrations