

CRAFTSMAN CRIBSHEET

ISO Material Groups: Cast Iron

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Cast Irons are divided into three main grades for machining. Within those categories they can be broken down into subgroups of ferritic and pearlitic cast iron. Ferritic cast irons are more ductile and have higher dimensional stability in higher temperatures. Pearlitic cast iron has a higher resistance to fretting corrosion. Fretting corrosion occurs in air when surfaces rub-under oscillation, rotation, or vibration- under load. Pearlitic cast irons also have higher hardness and higher mechanical properties.

Some cast irons can be heat-treated to martensitic with higher hardness values. Hardness numbers in the chart are approximate ranges. Machinability varies widely in each category because cast irons of each type can vary widely in ductility and mechanical properties. The less ductile the material the better the chip will break. There is little industry standard on the naming of the categories from insert manufacturers. Below approximates the categories and ranges.

K	Steel – Gray Cast Iron, Ductile (Nodular) Iron, Malleable Iron	Hardness (HB)	Hardness (HRC)
K1	Gray Cast Iron- Typically grey in appearance with lower toughness when compared to steel. Gray cast iron is used in engine blocks and gear boxes. Machinability Range: 90 – 170% Examples: ASTM Class 30, 35, 40, 50 and 60	~180 – ~260	<26
K2	Ductile (Nodular) Cast Iron- Nodular cast iron gets its name from the graphite nodules that help break chips. Mechanical properties like medium carbon steel with machinability of 11XX or 12XX steel. Machinability Range: 60% – 140% Examples: Ferritic 60-40-18, 65-45-12 Ferritic-Pearlitic 80-55-06	~160 - ~250	<25
K3	Malleable Cast Iron – Malleable cast iron is used for small components requiring toughness. It machines about 10% slower than equivalent ductile iron. Machinability Range: 60-200% Examples: Ferritic 32510 and 35018 Pearlitic 40010, 43010, and 45006	~130 – ~230	-

*Machinability is a percentage of 1212

Find the specific grade of cast iron in a reference manual to get SFM with HSS. Multiply the HSS number by 2 – 2.5 and it will provide a reference point for what SFM you should use with carbide. The SFM guidelines given based on material groups above can vary widely, which can be seen in the machinability range. 