Carbide vs. High Speed STEEL

Should I use Carbide or High Speed Steel?

Depends upon the application.

- Carbide tools are primarily used in finishing applications due to their high rigidity. This rigidity provides the user with a higher degree of accuracy and a better finish in their applications than with High Speed Steel. Carbide is more temperature resistant and can also be run 2-3 times faster than HSS. This means you can maximize your output on a production line by using a Carbide tool. Carbide is also extremely hard, letting them keep a sharper edge longer and making them more suitable for abrasive materials. However, this hardness comes at the expense of their toughness. Carbide is brittle and tends to chip rather than wear when conditions are not ideal. This means if you are inexperienced or the equipment you are using is not up to par, you run the risk of damaging the tool.

- High Speed Steel on the other hand, is very durable providing a good wear resistance. HSS tools are better used in higher load applications due to their higher durability as opposed to the brittle carbide. HSS is also more forgiving in non-ideal conditions and are generally much more inexpensive. This means if you tend to be hard on tools or your equipment is not quite up to par, HSS may be the way to go.

High-Speed Steel

Pro's: Tough, wear resistant, cheaper than carbide
Con's: Dull quicker than carbide, lower cutting temp, shorter life than carbide

Solid Carbide

Pro's: Harder than steel, higher cutting temps, higher speeds and higher feed rates, machine almost every type of material
Con's: Brittle, machine setup must be completely rigid

M-2 High-Speed Steel—For general-purpose applications and can withstand interrupted cuts. It also has good heat and wear resistance and is easy to grind.

M-3 High-Speed Steel—A little harder to grind than M-2, but has greater resistance to heat and wear. Use on abrasive materials.

M-34 Cobalt High-Speed Steel—Combines good wear resistance and excellent heat resistance. For heavy duty cutting on difficult-to-machine alloys and high-strength steels. It is easy to grind like M-2, but isn’t quite as tough. Also effective on sinter or cut marble materials.

M-42 and M-43 Cobalt High-Speed Steel—Very good wear resistance and stand up to heat better than any other M-series high-speed steels. They’re also easy to grind like H-2. Use on high-tennisile-strength and heat-resistant super alloys and stainless steels.

Carbide-Tipped—Premium microcrystallite carbide has high heat resistance and hardness. For hard-to-machine materials. Cannot be used on interrupted cuts.

T-15 High-Speed Steel—Best wear resistance and cutting ability of all high-speed steel materials. It also has good heat resistance and adequate toughness, but is more difficult to grind. This outstanding steel can machine materials from high-tensile-strength steel to cast iron, brass, aluminum, and plastic. Ideal for long-running applications and light cuts at high speeds.

CPM T-15 and CPM 76 High-Speed Steel—Made using a particle metalurgy process instead of wrought bar stock. They have superior toughness, grindability, and overall performance, plus high hardness and wear resistance. CPM T-15 is easier to grind than T-15. It’s designed for heavy cuts at high speeds in materials that are hard and have high abrasion resistance. CPM 76 is similar to CPM T-15 but has superior heat resistance. It’s best for applications requiring high heat resistance, high wear resistance, and good toughness.