

Crucible Steels for Knifemaking



Stainless

Grade	Carbon	Chromium	Molybdenum	Vanadium
440C	1.10	18.00	0.75	-
154 CM	1.05	14.00	4.00	-
CPM® S30V®	1.45	14.00	2.00	4.00
CPM® S60V® (440V®)	2.20	17.50	0.50	5.75
CPM® S90V® (420V®)	2.30	14.00	1.00	9.00

440C

440C is a high hardness martensitic stainless steel (HRC 58/60) which offers good wear resistance and good corrosion resistance.

154 CM

154 CM is a high molybdenum modification of 440C offering improved wear resistance (edge retention), better corrosion resistance, and excellent polishability.

CPM® S30V®

CPM S30V was designed for cutlery and offers the best overall combination of hardness, corrosion resistance and wear resistance

CPM® S60V® (440V®)

CPM S60V was the first high wear stainless produced by the CPM process. Its high vanadium content gives it superior wear resistance while maintaining the corrosion resistance of 440C.

CPM® S90V® (420V®)

CPM S90V offers significant improvement over S60V in both wear resistance and corrosion resistance. It has the highest wear resistance and best edge retention of any stainless steel available.

CPM®- Crucible Particle Metallurgy

The CPM process begins with the production of fine particles of steel by gas atomization of a prealloyed melt. In the atomizer, the molten metal is poured through a small nozzle where high pressure gas turns the liquid stream into a fine spray of tiny spherical droplets. These liquid droplets rapidly solidify into tiny powder particles which are spherical in shape and uniform in chemical composition. The atomized powder is collected and loaded into steel cans which are then hermetically sealed (i.e. evacuated and welded shut). The filled cans are exposed to sufficient temperature and pressure to consolidate the powder inside to 100% dense steel. The fully dense compacts then undergo normal mill processing to finished bar.

The CPM process results in very fine-grained steel which has a homogeneous composition and an extremely uniform microstructure. In the higher carbon CPM grades, the carbides which precipitate during solidification are extremely fine and remain so throughout mill processing and in the finished bar.

Shearing Guidelines

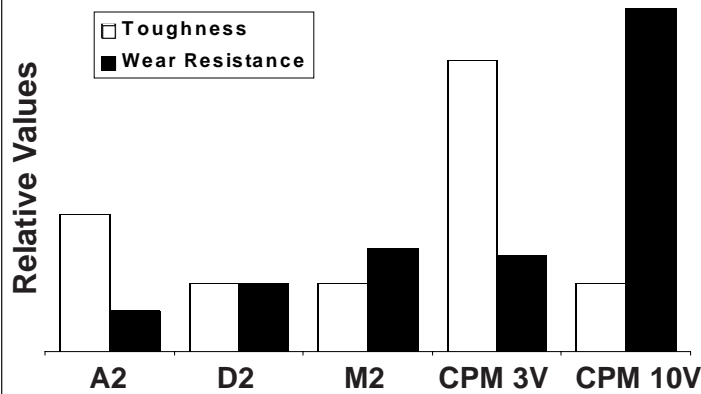
High alloy tool steels are difficult to shear due to their low ductility and high carbide content. Whenever possible, it is preferable to saw cut. The minimum width for shearing is 8 X the thickness, and the preferred width is 16 X the thickness. Straightening maybe required after shearing.

440C	Always shear at 400°F minimum.
154 CM	Always shear at 400°F minimum. Over 0.200" thick, shear at 600°F min.
CPM "S" (S30V, S60V, S90V)	Always shear at 400°F minimum. Over 0.180" thick should be saw cut.

Tool Steels

Grade	Carbon	Chromium	Molybdenum	Vanadium	Tungsten
Airkool® (A2)	1.00	5.25	1.10	0.25	-
Airdi® 150 (D2)	1.55	11.50	0.80	0.90	-
Rex® M2	0.85	4.15	5.00	2.00	6.40
CPM® 3V®	0.80	7.50	1.30	2.75	-
CPM® 10V®	2.45	5.25	1.30	9.75	-

Wear Resistance and Toughness



Airkool® (A2)

Airkool is a 5% chromium, air-hardening tool steel with good wear resistance. It is often used for blades because it is easy to grind and heat treat.

Airdi® 150 (D2)

Airdi 150 is a 12% chromium, air-hardening tool steel with improved wear resistance over A2.

Rex® M2 (M2)

Rex M2 is actually a high speed steel with better wear resistance and better attainable hardness (HRC 62) than D2 for better edge retention.

Advantages of CPM®

Ease of Fabrication for the Knifemaker:

- Consistent Heat Treat Response
- Predictable Size Change on Heat Treat
- Excellent Grindability

Higher Performance for the Knife User:

- Higher Alloy Grades Possible
- Improved Edge Retention
- Improved Toughness

CPM® 3V®

CPM 3V has wear resistance about equal to M2 for edge retention, and at HRC 58/60, it has more than twice the toughness of A2 for reduced chipping and breaking. It is easier to grind than D2.

CPM® 10V®

CPM 10V has the highest wear resistance and the best edge retention of all the blade steels due to the presence of a large volume of vanadium carbides.

**Crucible offers blade steels
in hot rolled sheets:
18-22" wide X 72" long
from 0.100" to 0.250" thick,
in full or half sheets.**

**Custom cutting/slitting is available.
Please inquire: 800-365-1168**

**For further property data and specific
heat treatment, please contact your
Crucible representative for data sheets.**

**Crucible
Service Centers**

Now in one location to serve you better!

Call Toll Free: 800-365-1168

Local Phone: 817-649-2800

FAX Toll Free: 800-483-7957

Local FAX: 817-633-8142

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