

Machining Guide

- Machinability
- Chip Control
- Speeds and Feeds
- Quality

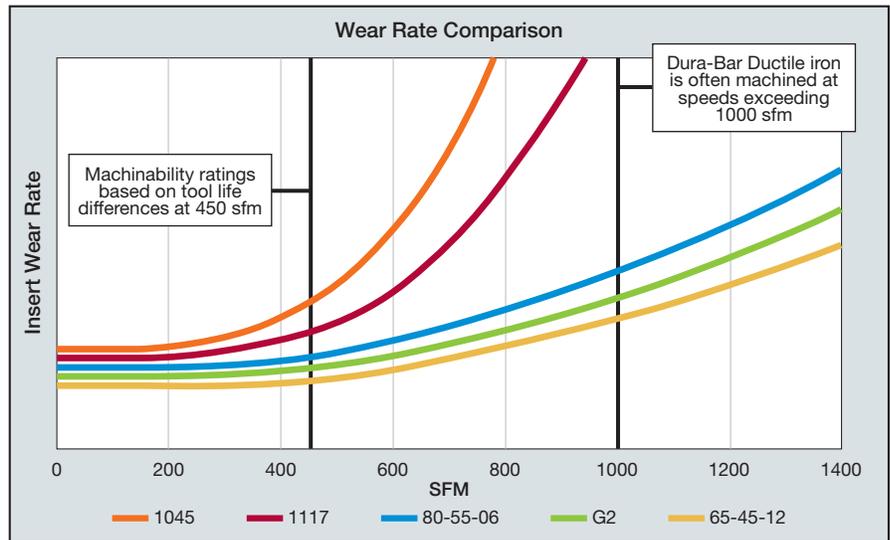
Machinability

Dura-Bar is an engineered iron that offers machining advantages over carbon and alloy steel as well as other continuous cast iron bars.

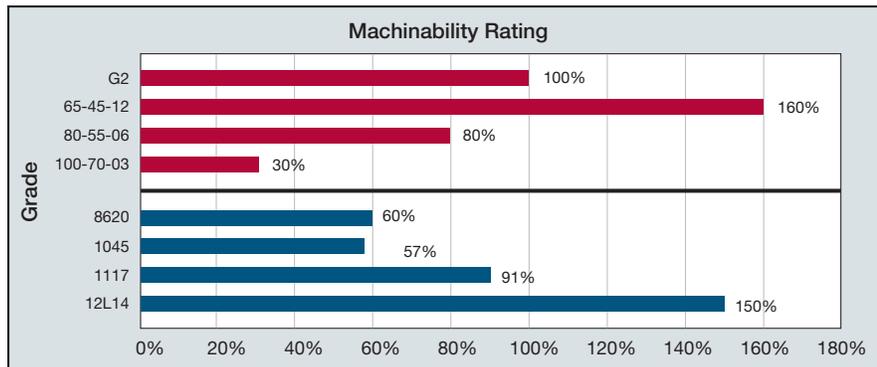
By using Dura-Bar you will be able to reduce overall costs by decreasing your cycle time, thereby increasing your parts per hour.

You will see significant improvement over steel in:

- Machinability
- Tool Wear
- Chip Control
- Surface Finish
- Minimal Deburring

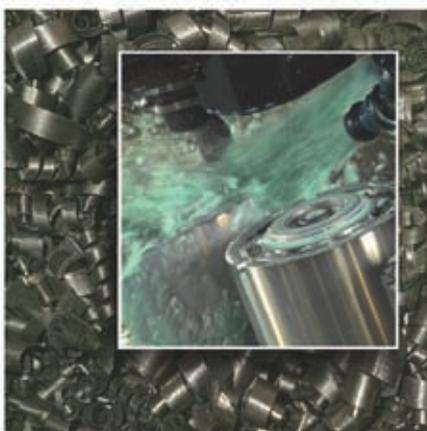


The Dura-Bar advantage is the ability to machine at high speeds with little increase in the wear rate of the insert. The difference between Dura-Bar ductile iron and carbon steel is the ability to machine at speeds in excess of 800 sfm without a dramatic decrease in insert life.

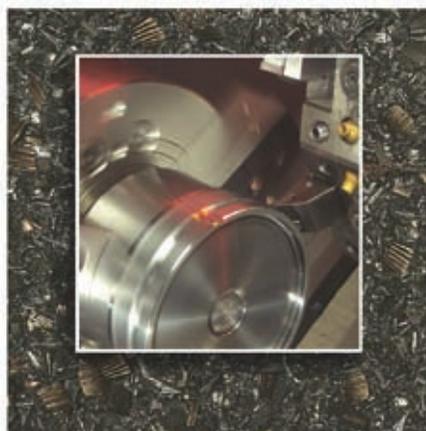


Machinability rating of Dura-Bar vs. carbon steel. Ratings based on percentage of tool life at 450 sfm using high speed steel tooling compared to 1212 steel at 100%.

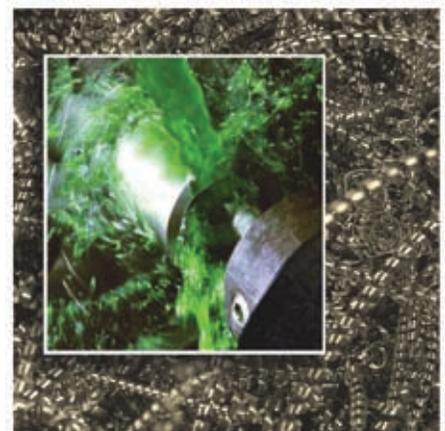
Chip Control



Dura-Bar ductile iron chips: consistent and controllable chip formation



Dura-Bar gray iron chips: fine, compact, consistent and controllable chip formation



Steel chips: typical stringy, uncontrollable chip formation

Speeds and Feeds

Below are the commonly used speeds* for acceptable tool life, based on an independent machine shop study.

65-45-12 Ductile Iron

Machining Operation	Machining Speed (sfm)	Feed (ipr)
Rough Turn (OD & ID)	800 - 1,200	.014 - .028
Finish Turn (OD & ID)	1,600 - 2,000	.004 - .020
Drilling/Milling (indexable)	475 - 825	.004 - .012
Drilling/Milling (solid carbide)	320 - 400	.003 - .012
Grooving (OD & ID)	900 - 1,500	.002 - .007

80-55-06 Ductile Iron

Machining Operation	Machining Speed (sfm)	Feed (ipr)
Rough Turn (OD & ID)	700 - 900	.008 - .024
Finish Turn (OD & ID)	1,000 - 1,500	.004 - .020
Drilling/Milling (indexable)	410 - 650	.004 - .015
Drilling/Milling (solid carbide)	270 - 350	.003 - .012
Grooving (OD & ID)	500 - 900	.002 - .007

100-70-03 Ductile Iron

Machining Operation	Machining Speed (sfm)	Feed (ipr)
Rough Turn (OD & ID)	450 - 750	.008 - .022
Finish Turn (OD & ID)	800 - 1,000	.006 - .010
Drilling/Milling (indexable)	400 - 600	.004 - .012
Drilling/Milling (solid carbide)	250 - 350	.003 - .012
Grooving (OD & ID)	400 - 800	.002 - .007

G1 and G2 Gray Iron

Machining Operation	Machining Speed (sfm)	Feed (ipr)
Rough Turn (OD & ID)	800 - 1,000	.014 - .028
Finish Turn (OD & ID)	1,400 - 1,800	.004 - .020
Drilling/Milling (indexable)	410 - 700	.004 - .015
Drilling/Milling (solid carbide)	270 - 350	.003 - .012
Grooving (OD & ID)	400 - 650	.002 - .007

Typical Depth of Cut: Rough Turn = .100" – .175" and Finish Turn = .010" – .050"

* Note: The recommended speeds listed above should be used on Dura-Bar cast iron only. These grades are specially produced to maximize speeds and feeds. Carbides, inclusions and other processing variables that have not been properly controlled will not allow all cast iron grades to be machined at the above speeds, and serious damage may occur to machine tools.

Quick Tips:

Inserts: For best results, use standard coated carbide insert grades, developed specifically for cast iron.

Chip Breakers: You will get good results with or without a chip breaker. A complex chip breaker design is not required due to the free-machining properties of Dura-Bar.

Coolant: Use water soluble or semi-synthetic coolant at a 4-6% concentration level.

Surface Finishes: In drilling, milling and turning Dura-Bar, excellent surface finishes, similar to 1144 steel, can be achieved.

Faster Speeds: Due to its dense fine-grained microstructure, Dura-Bar is clean and consistent, allowing for faster machining speeds than sand castings.

Quality

How Ductile Iron is Superior to Steel...

- Tool life is at least 2 times longer at 800 SFM
- Recommended surface footage up to 4 times faster
- Comparable mechanical strengths, even after heat treat
- It is 8% lighter weight and has 1/3 the vibration amplitude
- Superior wear resistance

What Graphite Does...

- Enhances machining by acting as a chip breaker
- Increases tool life by dissipating heat
- Reduces friction on the insert
- Improves wear performance in the application

A Commitment to Quality

Dura-Bar is an ISO-9001 Registered company committed to quality. We maintain our position as industry leader by producing the most consistently reliable, highest quality products.

Dura-Bar is pleased to offer its Zero Defect Guarantee against foundry defects. This Guarantee provides for the replacement of defective material and reimbursement of your cost of machining.



Please contact us for details about the guarantee, or visit our website at www.dura-bar.com.

Quick Formulas:

$$\text{RPM} = (\text{SFM} \times 3.82) / \text{Diameter of Cut}$$

$$\text{SFM} = (\text{RPM} \times \text{Diameter of Cut}) / 3.82$$



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