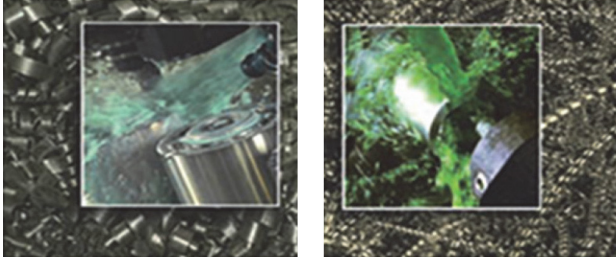


Dura-Bar Ductile Iron vs. Carbon Steel



The unique continuous casting process used to produce Dura-Bar yields a number of cost-saving advantages for manufacturers of metal components -- added resistance to wear and compression, better thermal conductivity, vibration and noise damping, improved fatigue strength, and the absence of lead.

Also, in situations where producing a component requires a high degree of turning, milling, drilling, and/or tapping, using Dura-Bar can result in dramatic savings in machining costs. That's because Dura-Bar ductile iron's superior machinability and consistent

defect-free quality permit faster machining speed and feed rates which can extend tool life. Dura-Bar's Zero Defect Guarantee is the only one of its kind in the industry.

For example, Dura-Bar 65-45-12 has a machinability rating of 160%, which is approximately 100% higher than 1144 steel (1212 is rated at 100%). That means that at the same machining speeds your customer can expect to double tool life or with the same tool life, they can expect to cut cycle time in half. In short, the more machining a part requires, the more you'll save with Dura-Bar. Learn about optimal machining speeds and feeds, typical depths of cut, comparisons of tooling wear rates and information on how Dura-Bar chips are cleaner and more efficient in the Dura-Bar Machining Guide at <http://www.durabar.com/advantages/machinability/>. Another advantage of using Dura-Bar is that it weighs 8% less than steel. Dura-Bar also can be well suited for applications where heat treating is necessary.

When evaluating Dura-Bar ductile iron as a potential replacement for steel, two specific grades are usually considered:

- 65-45-12: A material characterized by a ferritic matrix structure with small amounts of pearlite. 65-45-12 is an excellent replacement for such grades of steel as 1010, 1018, 1020, 12L14, 1212, and 1215.
- 80-55-06: A material typically containing 50% ferrite and 50% pearlite that is slightly less machinable than 65-45-12 but better suited for applications requiring added wear resistance and higher strength. 80-55-06 is a good replacement for such medium carbon steels as 1040, 1045, 1060, 1141, and 1144.

The following chart depicts how the material properties of Dura-Bar 65-45-12 and 80-55-06 ductile iron compare to those of a few common grades of steel.

| Material Property | Dura-Bar | | Hot Rolled Steel | | | | |
|----------------------------------|----------|----------|------------------|--------|--------|---------|--------|
| | 65-45-12 | 80-55-06 | 1018 | 1045 | 1117 | 1144 | 12L14 |
| Tensile Strength (psi/ksi) min. | 65,000 | 80,000 | 58,000 | 81,900 | 58,000 | 102,000 | 57,300 |
| Yield Strength (psi/ksi) min. | 45,000 | 55,000 | 31,900 | 45,000 | 31,900 | 60,900 | 34,100 |
| Elongation (% in 2") min. | 12 | 6 | 25 | 16 | 25 | 21 | 22 |
| Hardness - Average (BHN) | 180 | 229 | 116 | 163 | 116 | 212 | 121 |
| Machinability Rating (1212=100%) | 160% | 80% | 52% | 56% | 90% | 83% | 180% |
| Pieces/Insert Edge* | 340 | 190 | 104 | 112 | 180 | 165 | 340 |

Above information is for reference only. Actual results influenced by process variables and actual size.

*Relative tool life comparison done at 450 sfm, .010" feed and .125" doc