Applications Guide

- Dura-Bar vs. Steel
- Dura-Bar vs. Castings
- Dura-Bar vs. Aluminum
- Flexibility
## Compare the Performance - Better Under Pressure

<table>
<thead>
<tr>
<th>Mechanical Property</th>
<th>Units</th>
<th>Dura-Bar Ductile Iron 65-45-12</th>
<th>Hot Rolled Steel 1018</th>
<th>1045</th>
<th>1117</th>
<th>1144</th>
<th>12L14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>psi</td>
<td>65,000</td>
<td>58,000</td>
<td>58,000</td>
<td>102,000</td>
<td>57,000</td>
<td></td>
</tr>
<tr>
<td>Yield Strength</td>
<td>psi</td>
<td>45,000</td>
<td>31,900</td>
<td>45,000</td>
<td>31,900</td>
<td>60,900</td>
<td>34,100</td>
</tr>
<tr>
<td>Elongation</td>
<td>% in 2&quot;</td>
<td>12</td>
<td>25</td>
<td>25</td>
<td>21</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Hardness - Average</td>
<td>BHN</td>
<td>180</td>
<td>116</td>
<td>116</td>
<td>212</td>
<td>121</td>
<td></td>
</tr>
<tr>
<td>Machinability Rating</td>
<td></td>
<td>1212=100%</td>
<td>52%</td>
<td>90%</td>
<td>83%</td>
<td>180%</td>
<td></td>
</tr>
<tr>
<td>Pieces/Insert Edge</td>
<td></td>
<td>340</td>
<td>104</td>
<td>112</td>
<td>180</td>
<td>165</td>
<td></td>
</tr>
</tbody>
</table>

In the table above are the basic performance data of our two most popular grades of ductile iron and several common grades of carbon steel. Above information is for reference only. Actual results influenced by process variables and actual size.

## Verified Rated System Pressure: 6,500 psi

<table>
<thead>
<tr>
<th>Bore Size (in)</th>
<th>Minimum Allowable Wall Thickness (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>0.050</td>
</tr>
<tr>
<td>1.0</td>
<td>0.100</td>
</tr>
<tr>
<td>2.0</td>
<td>0.150</td>
</tr>
</tbody>
</table>

Testing, verification, and rating performed by the Fluid Power Institute at the Milwaukee School of Engineering.

Method of verifying the rated fatigue pressure (or establishing the rated burst pressure; or both) of the pressure containing envelope conforms to NFPA/T2.6.1 R2-2000. Fluid power components - Method for verifying the fatigue and establishing the burst pressure ratings of the pressure containing envelope of a metal fluid power component, for the values, categories and special conditions (if any) as specified. The configuration shown above has an RFP = 44.82 MPa (6,500 psi), category C/90/ where k, for ductile iron = 0.14.

For more specific information and combinations of minimal allowable wall thicknesses with maximum system pressures, please see our website at: www.dura-bar.com/pressure. Contact us to discuss your specific application.

## Typical Conversion to Dura-Bar

### Problems Vs. Steel
- Leaded material requires coolant disposal costs
- Poor surface finish
- Poor wear resistance

### Solutions and Benefits:
- Lead-free Dura-Bar
- Superior surface finish
- Excellent grooving and drilling
- Extended tool life
- Lower shipping costs due to lighter weight Dura-Bar

### Problems Vs. Castings
- Inconsistent availability and delivery
- Low quality material
- Parts in varying lengths

### Solutions and Benefits:
- Reliability and consistency from a stable manufacturer
- Zero-Defect guarantee
- No patterns needed
- Immediate availability from a Dura-Bar distributor
- Improved machinability
- Total part cost reduction

### Problems Vs. Aluminum
- Material not capable of withstanding high pressure
- Deburring

### Solutions and Benefits:
- Dura-Bar is pressure rated to 8,500 psi
- Little or no deburring
The Benefits of Dura-Bar

Dura-Bar vs. Steel

- Dura-Bar is a cost-saving alternative to many low-medium carbon steels
- Faster machining speeds, improved production
- Minimized deburring
- Longer tool life and better surface finishes
- Improved wear resistance
- Reduced noise, better vibration damping
- Compact, consistent, lead-free chips
- Lighter weight

Dura-Bar vs. Castings

- Dura-Bar is a high-quality replacement for castings
- Zero Defect Guarantee
- Dense, fine-grained microstructure means superior machinability
- No pattern or tooling costs
- Over 500 sizes available

Dura-Bar vs. Aluminum

- Dura-Bar can be superior to aluminum for parts demanding higher pressures, including hydraulic manifolds, seals & valves
- Dura-Bar 65-45-12 ductile is pressure rated to 6,500 psi
- Improved machinability for drilling
- Minimized deburring
- Compact and consistent chips

Plain carbon steel chips, shown above, are "stringy" and difficult. By contrast, Dura-Bar yields fine and easy to control chips, which are easy to evacuate from the work zone and often eliminate the deburring process.

The resulting bar stock is free of dross, slag, sand, virtually all porosity and other impurities that create machining problems, which increase the cost of finished goods.

Dura-Bar is superior to aluminum due to it's inherent strength and ability to withstand the high pressure demands of many applications. Aluminum often isn't up to the challenge.
The Possibilities are Endless

- Rotary Vane Pump Motor
- Hydraulic Cylinder Piston
- Hydraulic Cylinder Piston
- Hydraulic Cylinder Piston
- Hydraulic Cylinder Pistons
- Battery Grid Mold Plate
- Hydraulic Pump Plate
- Hydrostatic Cylinder Swash Plate
- Glass Mold Plunger
- Poppet
- Belt Pulley
- Pulley
- Pulley
- Textile Rail
- Gyroscopic Ring
- Sealing Rings
- Hydraulic Cylinder Rod Guide
- Hydraulic Cylinder Rod Guide
- Hydraulic Cylinder Rod Guide
- Hydraulic Cylinder Rod Guide
- Hydraulic Cylinder Rod Guides
- Steel Mill Roll
- Chain Link Roller
- Coffee Grinding Roller
- Eccentric Weighted Roller
- Disk Brake Rotor
- Disk Brake Rotor
- Disk Brake Rotor
- Vane Pump Rotor
- Compressor Rotor
- Feeder Screw
- Pump Screws
- Lock Sleeve
- Spool
- Spool
- Hydraulic Swivel Spool
- Hydraulic Swivel
- Hydraulic Swivel
- Chain Drive Sprocket
- Cone Oil Tool
- Small Slip Ring Oil Tool
- Slip Ring Oil Tool
- Split Ring Oil Tool
- Forklift Power Steering Valve
- Fire Hydrant Water Valve
- Pump Valve Body
- Valve Guide
- Valve Guide
- Valve Guide

Dura-Bar®
Continuous Cast Iron Bar Stock
Dura-Bar is available in many Grades, Shapes and Sizes.

Rounds:
As-Cast or Cold Finished

Squares / Rectangles
As-Cast or Cold Finished

Tubes:
As-Cast or Cold Finished

Custom Shapes:
As-Cast

Standard bar length - 72” & 144”

Grades:

Ductile Iron
- Alternative to Low & Medium Carbon Steel
- Superb Free-Machining Properties
- Lower Heat Treat Costs
- Comparable Strength

Gray Iron
- Excellent Wear Resistance
- Improved Vibration Damping
- Superior Machining Finish
- Responds Well to Conventional Heat Treat Methods

Ni-Resist
- Ideal For Corrosive Environments

Dura-Bar Continuous Cast Iron Bar Stock Has Many Uses.

Renewable Energy
Agriculture
Automotive

Construction
Military
Hydraulics

Industrial
Oil & Gas
Primary Metals

There are many ways to save with Dura-Bar. Customers who have made the switch typically profit most due to:

- Significant total part cost reduction.
- Extended tool life.
- Machining at higher speeds and feeds.
- Lower heat treat cost.

Dura-Bar Metal Services

www.dura-barMS.com

A Commitment to Quality
We maintain our position as industry leader by producing the most consistently reliable, highest quality products.
Dura-Bar is an ISO-9001 Registered company committed to quality.
Dura-Bar is sold with a Zero-Defect Guarantee.
Dura-Bar is recognized by the American Bureau of Shipping with a Certificate of Casting Facility and Process Approval: Iron Castings for Marine Applications.
Visit us at www.dura-bar.com for more information.

Woodstock, IL 800-526-0548
Salisbury, NC 800-438-9174
York, PA 800-722-5858