

100-70-03 Ductile Iron

Description:

Dura-Bar 100-70-03 ductile iron contains nodular graphite in a matrix of pearlite with small amounts of ferrite. The pearlitic structure maximizes strength and wear characteristics in a non-alloyed as-cast ductile iron. This specification is similar to ASTM A536 100-70-03.

Applications

Fluid power:

Cylinder blocks, Gerotors, Glands, Manifolds, Pistons, Rotors, Valves

Automotive:

Gears

Machinery:

Barrell Rollers, Bushings, Chain Sheave Rollers, Chuck Bodies, Die Blocks, Flywheels, Gear Racks, Gears, Housings, Pile Drivers, Pulleys, Rams, Rotary Tables

Miscellaneous:

Port Plate

Power Transmission:

Gears, Pulleys

Pump/Compressor:

Gears, Housings, Liners, Pistons, Rotors

Steel Mill:

Guide Rolls, Pinch Rolls, Runout Table Rolls

Transportation:

Camshafts, Carriers, Gears, Pulleys, Rail Spacers

Physical Properties

Property	Measurement
Density (lbs/in ³)	0.255
Poisson's ratio [ν]	Min: .275 ; Max: .28
Modulus of elasticity (Tension) (psi) [E]	23-25E6
Modulus of rigidity (Shearing) (psi) [G]	9,803,922
Thermal conductivity (BTU/Hr/ft ² /inch/°F), (Range: Room Temp - 212°F)	18.68
Thermal expansion coefficient(/°F) [α], (Range: 70 - 212°F)	6.00E-06
Damping capacity	5 - 20*
Electrical Resistivity (Microhms x Cm)	75-80 **
Magnetic properties (KiloGauss/Oersteds@100 Oersteds)	High permeability, low coercive force
Heat treat response (Rc)	55-60

* Damping = ability of material to quell vibration through elastic hysteresis. Expressed as percentage of total energy/amplitude lost in one complete stress-strain cycle. Damping can be related to chemical analysis/composition and microstructure.

** Specific resistivity of all irons increases with temperature. Chemical composition and microstructure also play roles in determining electrical resistivity. Increasing amounts of carbon/silicon increase ER.

Mechanical Properties:

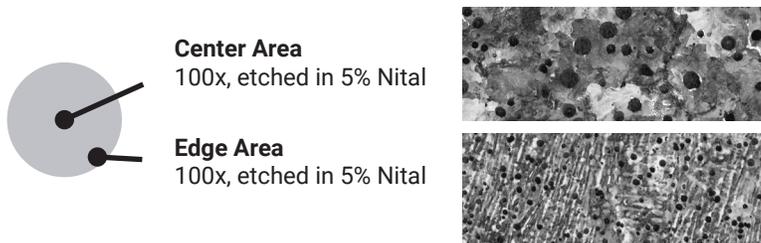
Hardness properties for various diameters are shown in the table. Hardness properties listed are minimum and maximum across the bar. For rectangles, squares and shapes, the hardness properties will depend on minimum and maximum section thickness and will be supplied on request.

Size Range		BHN	
Inches	mm	Min	Max
1.000 – 20.000	25 – 508	241	329

Tensile strength is determined from a longitudinal test specimen taken from mid-radius of the as-cast bar.

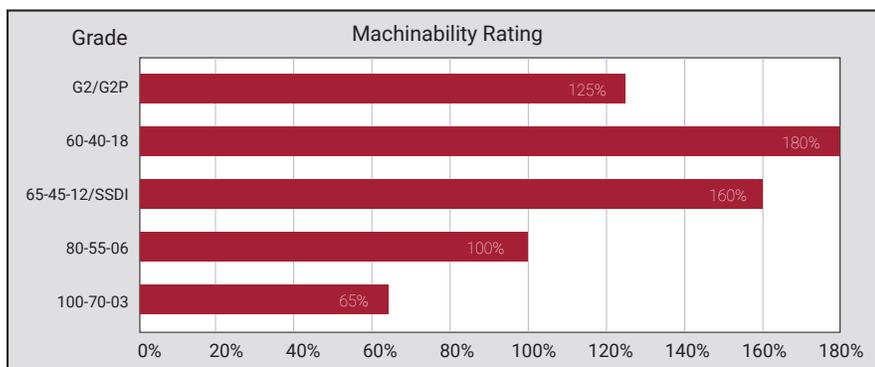
Mechanical Properties	
Tensile strength psi (min)	100,000
Yield strength psi (min)	70,000
Elongation (min)	3%

Microstructure:



The microstructure consists of Type I & Type II nodular graphite as defined in ASTM A247. The matrix is highly pearlite with small amounts of ferrite. The edge or rim will have a higher nodule count and contain slightly higher ferrite concentration when compared to the center. Chill carbides will be less than 5% in any field at 100x and will be well dispersed.

Machinability



* Based on 1212 steel = 100%

Heat Treat Response:

Dura-Bar 100-70-03 can be oil quench hardened from 1600° F (885° C) to a minimum hardness of Rockwell C 50 on the outside of the bar. The inside diameter hardness will be less than Rockwell C 50. Lower quench hardness on the inside diameters are a result of larger graphite nodules and not a loss of matrix hardness. Get more details including typical Jominy end quench curve, methods and cycle times, and temperature effects by downloading the Dura-Bar Heat Treating Guide.

Chemical Composition:

Element	Percentage
Carbon*	3.50 - 3.90%
Silicon*	2.25 - 3.00%
Manganese	0.15 - 0.35%
Sulfur	0.025% Max
Phosphorus	0.05% Max

*Carbon and silicon targets are specified for each bar size in order to maintain mechanical properties. Small amounts of alloying elements are used to stabilize the pearlitic structure. Magnesium treatment is employed to produce nodular graphite.

Applicable Specifications

ASTM A536 100-70-03

Forms Manufactured

Dura-Bar Ductile 100-70-03 is a non-stock grade, which can be ordered in volume quantities from our distributors.

Disclaimer

All of the above information is for reference only. Actual results are influenced by process variables and actual size of the raw material.

Visit www.dura-bar.com/applications/index.cfm to see successful applications being made from Dura-Bar, including their design and cost benefits. Contact us today to discuss your application and how you can start saving with Dura-Bar.