

## G2S Gray Iron

### General Description:

Dura-Bar G2S is a high strength highly pearlitic gray iron. It combines both superior strength and surface hardenability attributes. By an addition of molybdenum, G2S maintains excellent strength throughout the cross-section of the bar. A minimum of 40,000 psi tensile strength from the mid-radius is achieved. Using additional alloying elements, the carbon-rich material needed for effective induction or flame hardening is an additional compliment to G2S. G2S is ideal for applications where strength, hardenability, and creep resistance are required.

### Microstructure:



The microstructure will contain Type VII, A, size 4-6 graphite as defined in ASTM A247. The matrix is fully pearlitic. The edge or rim will consist of Type D, size 4-6 graphite in a matrix consisting of 80% pearlite. Chill carbides will be less than 5% in any field at 100x and are well dispersed.

### Heat Treat Response:

Dura-Bar G2S can be hardened by fast methods, such as flame and induction hardening. Carbon-rich pearlite in the rim of the continuous cast bars will effectively transform to martensite (hard phase of iron). Contrasted with a more ferritic rim, continuous cast bars can result in untransformed microstructure and thus a less ideal material hardness after heat treatment.

In addition to surface hardening, Dura-Bar G2S can be heat treated by conventional quench and temper methods. 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*	2.60 - 3.75%
Silicon*	1.80 - 3.00%
Manganese	0.60 - 0.95%
Sulfur	0.07% Max
Phosphorus	0.12% Max

\*Carbon and silicon targets are specified for each bar size in order to control the size and shape of the graphite flake. Alloying elements are used to promote enhanced tensile strength and to stabilize the pearlitic structure.

## Mechanical Properties:

Brinell hardness values for nominal as-cast diameters are shown in the table. Hardness properties listed are minimum and maximum across the bar. Hardness values for rectangles and squares are a function of the height and width ratios and will be supplied on request.

Size Range		BHN	
Inches	mm	Min	Max
2.500 – 6.00	64 - 152	207	290

Tensile strength of Dura-Bar G2S is determined from a test bar removed from the mid-radius of a continuous cast bar. Test bars from the mid-radius will meet the minimum 40,000 psi listed in the table below. Since mid-radius test bars meet a 40,000 psi class of iron, separately cast bars are cast for reference only.

Mechanical Properties	
Tensile strength psi (min)	40,000
Yield strength psi (min)	N/A *
Elongation (min)	N/A*

\* Gray iron will not yield/elongate before fracture.  
 The behavior of gray iron is non-ductile.

## Typical Applications:

**Automotive:** Gears, High Performance Engine Components

**Fluid Power:** Cylinder blocks, Gerotors, Glands, Manifolds, Pistons, Rotors, Valves

**Machinery:** Barrel Rollers, Bushings, Chain Sheave Rollers, Chuck Bodies, Die Blocks, Flywheels, Gear Racks, Gears, Housings, Pile Drivers, Press Rams, Pulleys, Rams, Rotary Tables, Tie Rod Nuts

**Miscellaneous:** Core Boxes, Dies, Disamatic Pouring Rails, Grinding Rolls, Mill Liners, Pattern Plates, Plunger Pin

**Oil and Gas:** Slips, Cones, Retainers, Mandrels, Ball Seats, Lock Rings, Completion Tool Components

**Power Transmission:** Gears, Pulleys

**Pump and Compressor:** Gears, Housings, Liners, Pistons, Rotary Screws, Rotors

**Steel Mill:** Guide Rolls, Pinch Rolls, Runout Table Rolls

**Transportation:** Gears, Motorcycle Disk Brake, Pulleys, Rail Spacers

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