WGB Industries Inc.

ALLOY 319.1

319.1 is widely used in the automotive, aerospace and equipment manufacturing industry, due to its excellent casting and mechanical properties. The alloy has good castability, weldability and pressure tightness along with resistance to hot cracking. 319.1 also has the ability to be cast into complex shapes, good corrosion resistance, and its balance of strength and weight make it ideal for many applications. Machining characteristics are good, however, carbide-tipped tools are recommended.

APPLICATIONS

- Engine components
- Cylinder heads
- Engine blocks
- Intake manifolds
- Pistons
- Machine guards
- Compressor housings
- Transmission cases
- Gear housings
- Motor Housings
- Structural components
- Bracket mounts
- Control arms
- Pump housings
- Valve bodies

Mechanical Properties

The mechanical properties of 319.1 can vary based on the temper or heat treatment condition. Here are the typical properties for F As-Cast, T5 and T6 conditions.

Chemical Composition Limits by %

- Silicon (Si): 5.5 - 6.5
- Iron (Fe): 1.0 max
- Copper (Cu): 3.0 - 4.0
- Manganese (Mn): 0.1 - 0.5
- Magnesium (Mg): 0.1 max
- Nickel (Ni): 0.35 max
- Zinc (Zn): 1.0 max
- Titanium (Ti): 0.25 max
- Chromium (Cr): 0.1 max
- Other elements, total: 0.5 max
- Aluminum (Al): Balance

- **As-Cast (F)**
- Tensile Strength: 27 ksi)
- Yield Strength: 18 (ksi)
- Elongation: 2.0% in 2"
- Brinell Hardness: 70

- **Heat-Treated (T5)**
- Tensile Strength: 30 ksi)
- Yield Strength: 26 ksi)
- Elongation: 1.5% in 2"
- Brinell Hardness: 80

- **Heat-Treated (T6)**
- Tensile Strength: 36 ksi)
- Yield Strength: 24 ksi)
- Elongation: 2.0% in 2"
- Brinell Hardness: 80