

MIM-4140 Low Alloy Steel

Low Alloy Steel Injection Molding

NEWAY PRECISION WORKS

NewayPrecision

www.newayprecision.com

Technical Data: MIM-4140

Product Description

MIM-4140 is a remarkable low-alloy steel at the intersection of advanced materials and precision manufacturing. It combines the versatile Metal Injection Molding (MIM) process with the renowned properties of 4140 steel.

This alloy offers exceptional strength, making it ideal for durability applications. Its low-alloy composition enhances toughness, allowing it to withstand heavy loads and high-stress conditions. MIM-4140 also boasts excellent machinability, ensuring that complex, near-net-shape parts can be produced precisely.

From automotive components to industrial machinery and beyond, MIM-4140 low-alloy steel shines as a material of choice for intricate parts, demanding a unique blend of strength, toughness, and precision.



Chemical Composition

Chemical Composition (Weight %)	Carbon (C)	Manganese (Mn)	Phosphorus (P)	Sulfur (S)	Chromium (Cr)	Molybdenum (Mo)	Iron (Fe)
Value	0.38 - 0.43	0.75 - 1.00	0.035 (max)	0.040 (max)	0.80 - 1.10	0.15 - 0.25	Balance

Physical and Mechanical

Alloys	Status	Tensile Strength	Yield Strength	Impact Strength	Hardness	Young's Modulus	Poisson's Ratio	Elongation	Density
		Mpa	Mpa	J	HRC	Gpa	Ratio	% in 25.4 mm	g/cm ³
Value	Annealed	850	680	45	24.5	205	0.27	12	7.85

Typical Properties

Wear Resistance



MIM-4140 low alloy steel parts exhibit exceptional wear resistance. This remarkable property is attributed to their high hardness, typically exceeding HRC 50, which results from the alloy's composition and heat treatment. The fine microstructure achieved through the metal injection molding (MIM) process enhances the wear resistance further.

MIM-4140 parts find essential applications in industries where wear resistance is paramount. These include manufacturing machinery components like gears, shafts, and bushings that experience continuous movement and contact.

Note

The above data are reference material science data. This data reference is not binding and is not considered as authoritative test data. If your material requirements are extremely precise, please contact our material engineers. Tel | +86 18926788217 | Web | www.newayprecision.com | Contact Neway



MIM-4140 Low Alloy Steel

Low Alloy Steel Injection Molding

NEWAY PRECISION WORKS

NewayPrecision

www.newayprecision.com

Typical Properties

Toughness

MIM-4140 low alloy steel parts exhibit excellent toughness, making them well-suited for demanding applications. Toughness is the ability of a material to absorb energy without fracturing, and MIM-4140 excels in this regard due to its controlled microstructure and alloy composition. Even with its high hardness, it can withstand sudden impacts and dynamic loading conditions without catastrophic failure.

Industries such as automotive and aerospace utilize these parts for safety-critical components, including brackets, connectors, and structural elements that must withstand collisions, vibrations, and other dynamic forces.



Fatigue Strength



The controlled microstructure and alloy composition of MIM-4140 contribute to its ability to resist fatigue failure, ensuring prolonged operational life even under strenuous conditions.

4140 low alloy steel MIM parts find essential applications where fatigue strength is paramount. Industries such as automotive and aerospace rely on these components for various safety-critical parts, including gears, shafts, and structural elements that must endure continuous operational stress cycles. Additionally, industrial machinery utilizes MIM-4140 for components like bearings and fasteners, ensuring they can withstand prolonged and repeated stress without failing.

Dimensional Stability

MIM-4140 low alloy steel parts exhibit excellent dimensional stability, maintaining their precise shape and size during and after the metal injection molding process. The minimal distortion, warping, or shape alterations during heat treatment and quenching make MIM-4140 an ideal choice for applications with critical tight tolerances and consistent dimensions.

Automotive and aerospace sectors utilize MIM-4140 for critical engine and transmission components, ensuring seamless fits and peak performance. Furthermore, electronics industries rely on this stability for connectors and housings, guaranteeing reliable connections and consistent performance.



Note

The above data are reference material science data. This data reference is not binding and is not considered as authoritative test data. If your material requirements are extremely precise, please contact our material engineers. Tel | +86 18926788217 | Web | www.newayprecision.com | Contact Neway

