Low Carbon Mild Steel Grades (Soft and Ductile) - Comprehensive Guide

Introduction

Low carbon mild steel grades are widely recognized for their excellent workability and ductility. These properties make them an ideal material for a broad spectrum of industrial and structural applications. Each grade offers specific benefits to suit different project requirements, from superior machinability to high tensile strength. This guide provides an in-depth look at three key low-carbon grades—AISI 1008, AISI 1018, and AISI 1020—helping you to select the best material for your CNC machining and fabrication needs.

AISI 1008

Overview
AISI 1008 is a low carbon steel that excels in applications requiring exceptional ductility and machinability. Its high malleability allows it to be easily formed, stamped, or deep-drawn into lightweight components, while still maintaining good surface quality.

Mechanical Properties

Property	Value
Carbon Content	0.08% (max)
Ultimate Tensile Strength (MPa)	300 – 350
Elongation (%)	22 – 28
Hardness (HB)	95 – 120
Machinability (% relative)	90%

Typical Applications

- Cold-formed parts such as rods and brackets
- Lightweight structural components
- Wire rods for low-strength applications

Advantages

- High malleability, making it easy to work with

- Cost-effective for mass production
- Compatible with surface treatments such as galvanization

AISI 1018

Overview
Known for its excellent weldability and ease of machining, AISI 1018 is widely utilized in precision CNC machining. It delivers good surface finish and mechanical properties, making it a go-to choice for small, intricate parts.

Mechanical Properties

Property	Value
Carbon Content	0.18%
Ultimate Tensile Strength (MPa)	440 – 470
Elongation (%)	15 – 17
Hardness (HB)	126 – 137
Machinability (% relative)	70%

Typical Applications

- Gears, pins, and spindles
- Shafts for machinery
- Components requiring good dimensional stability

Advantages

- Excellent surface finish during machining
- Consistent quality for high-tolerance applications
- Suitable for carburizing to enhance wear resistance

AISI 1020

Overview
AISI 1020 is a versatile, low-carbon grade that blends toughness with ease of shaping. With higher tensile strength compared to AISI 1008, it is an excellent option for light-duty parts requiring mechanical strength.

Mechanical Properties

Property	Value
Carbon Content	0.20%
Ultimate Tensile Strength (MPa)	395 – 450
Elongation (%)	20 – 30
Hardness (HB)	111 – 149
Machinability (% relative)	65%

Typical Applications

- Light-duty gears and shafts
- Automotive sub-assemblies
- Frames and other structural parts

Advantages

- Superior toughness and durability
- Weldable and easily machinable
- Affordable for bulk fabrication

Comparison Table

Grade	Ultimate Tensile Strength (MPa)	Elongation (%)	Hardness (HB)	Machinability	Primary Applications
AISI 1008	300 – 350	22 – 28	95 – 120	90%	Wire rods, brackets, and cold-formed parts.
AISI 1018	440 – 470	15 – 17	126 – 137	70%	Gears, spindles, and shafts.
AISI 1020	395 – 450	20 – 30	111 – 149	65%	Frameworks, light gears, and rods.

Selecting the Right Steel for Your Project

Each of these grades offers unique strengths, ensuring they cater to diverse machining, forming, and weldability requirements. AISI 1008 is perfect for lightweight forming tasks, while AISI 1018 fits high-precision machining needs. For stronger components, AISI 1020 offers enhanced toughness.

With Essengold Parts' advanced CNC machining solutions, you can experience precision, efficiency, and tailored results for your mild steel applications. Our team is ready to help you meet your project goals with confidence.

End of Guide