

High Carbon Mild Steel Grades (Hard and Wear-Resistant) – Comprehensive Guide

Introduction

High carbon steel grades are renowned for their superior hardness, strength, and wear resistance. These properties make them the go-to materials for high-impact and high-durability applications. This guide comprehensively examines two essential high carbon steel grades, AISI 1055 and AISI 1095, to help you identify the optimal material for your specific machining and manufacturing needs.

AISI 1055

Overview

AISI 1055 is a versatile high carbon steel with balanced strength and machinability. It delivers excellent wear resistance, making it suitable for heavy-duty applications where durability is key.

Mechanical Properties

Property	Value
Carbon Content	0.50 – 0.60%
Ultimate Tensile Strength (MPa)	620 – 720
Yield Strength (MPa)	330 – 450
Elongation (%)	12 – 16
Hardness (HB)	180 – 240
Machinability (% relative)	50%

Typical Applications

- **Railway tracks** subjected to high stress and friction
- **Agricultural tools** such as plow blades and harrows
- **Heavy-duty machinery parts**, including gears and shafts

Advantages

- High resistance to wear and abrasion
- Suitable for components exposed to heavy loads and impact forces
- Cost-effective for applications requiring high durability

AISI 1095

Overview

AISI 1095 is a high carbon steel noted for its exceptional hardness, edge retention, and wear resistance. Ideal for sharp-edged tools and high-strength components, this material is frequently utilized in demanding industrial applications.

Mechanical Properties

Property	Value
Carbon Content	0.90 - 1.03%
Ultimate Tensile Strength (MPa)	850 - 1,000
Yield Strength (MPa)	525 - 600
Elongation (%)	6 - 10
Hardness (HB)	200 - 300
Machinability (% relative)	40%

Typical Applications

- **Industrial cutting tools**, including knives, blades, and scrapers
- **Springs** used in high-tension and high-wear environments
- **High-performance components** requiring outstanding edge retention and durability

Advantages

- Exceptional hardness for cutting and impact-resistant applications
 - Excellent edge retention and ability to maintain sharpness
 - Reliable performance in high-stress, high-wear scenarios
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Comparison Table

Grade	Ultimate Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)	Hardness (HB)	Machinability	Primary Applications
AISI 1055	620 - 720	330 - 450	12 - 16	180 - 240	50%	Railway tracks, agricultural tools, and machinery parts.
AISI 1095	850 - 1,000	525 - 600	6 - 10	200 - 300	40%	Cutting tools, springs, and high-strength components.

Selecting the Right Steel for Your Project

AISI 1055 and AISI 1095 offer distinct advantages for high carbon steel applications. AISI 1055 combines wear resistance and machinability for heavy-duty uses like agricultural tools, while AISI 1095 provides unparalleled hardness and edge retention for precision cutting tools and springs.

For reliable, high-quality mild steel machining, Essengold Parts offers advanced CNC solutions tailored to your project needs. Our expertise ensures precision, efficiency, and optimal performance across a range of high carbon steel applications.

End of Guide