

Medium Carbon Mild Steel Grades (Strong and Durable) – Comprehensive Guide

Introduction

Medium carbon steel grades are widely valued in engineering and manufacturing for their balanced combination of toughness, strength, and machinability. These materials provide enhanced mechanical properties while maintaining sufficient workability for general-purpose applications. This guide offers a detailed look at two key grades, AISI 1045 and EN8 (080M40), highlighting their properties, benefits, and practical uses to assist in material selection for specific projects.

AISI 1045

Overview

AISI 1045 is a medium carbon steel known for its superior tensile strength, hardness, and wear resistance. It offers an excellent compromise between machinability and enhanced mechanical properties, making it highly suitable for demanding applications.

Mechanical Properties

Property	Value
Carbon Content	0.42 – 0.50%
Ultimate Tensile Strength (MPa)	570 – 700
Yield Strength (MPa)	310 – 450
Elongation (%)	16 – 20
Hardness (HB)	160 – 210
Machinability (% relative)	55%

Typical Applications

- **Axles and shafts** for industrial machinery
- **Bolts and studs** requiring high wear resistance
- **Heavy machinery parts**, including spindles and couplings

Advantages

- High durability and wear resistance for machinery components

- Suitable for both hot forging and cold drawing applications
 - Can be heat-treated for improved performance
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EN8 (080M40)

Overview

EN8 (080M40) is a versatile grade offering excellent tensile strength and improved wear resistance. It is a medium carbon steel that performs well in both normalized and heat-treated conditions, making it a popular choice for automotive components and mechanical engineering applications.

Mechanical Properties

Property	Value
Carbon Content	0.36 - 0.44%
Ultimate Tensile Strength (MPa)	580 - 700
Yield Strength (MPa)	305 - 450
Elongation (%)	14 - 16
Hardness (HB)	180 - 230
Machinability (% relative)	60%

Typical Applications

- **Crankshafts** and **rollers** in automotive engineering
- **Gears** and **shafts** requiring a balance of strength and toughness
- **Hydraulic components** for heavy-duty operations

Advantages

- Enhanced wear resistance for extended service life
 - Compatible with a range of mechanical processes, including heat treatment
 - Reliable performance under high-stress conditions
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Comparison Table

Grade	Ultimate Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)	Hardness (HB)	Machinability	Primary Applications
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	Strength (MPa)					
AISI 1045	570 - 700	310 - 450	16 - 20	160 - 210	55%	Axles, bolts, spindles, and heavy machinery parts.
EN8 (080M40)	580 - 700	305 - 450	14 - 16	180 - 230	60%	Crankshafts, gears, rollers, and hydraulic components.

Selecting the Right Steel for Your Project

Both AISI 1045 and EN8 (080M40) are excellent choices for medium carbon steel, offering a blend of strength and machinability tailored to heavy-duty and structural requirements. While AISI 1045 excels in high-strength mechanical operations, EN8 provides additional wear resistance and is favored for precision automotive applications.

Whether you require components that withstand high stress, resist wear, or endure heavy usage, Essengold Parts' CNC machining services ensure precision and efficiency in delivering solutions tailored to your needs.

End of Guide