



EN8 vs EN8A vs EN8B vs EN8C vs EN8D vs EN8M vs EN8DM: Complete Steel Grade Comparison

Description

Introduction

The EN8 series represents a family of versatile medium-carbon steels with subtle variations that impact machinability, strength, and heat treatment response. This guide compares:

- Chemical composition differences
- Mechanical properties
- Optimal heat treatment
- Recommended applications

Steelmet Industries supplies all EN8 variants as:

• Round bars (Ø 10mm to 300mm)

• Flat bars and forged blanks

• Turned or ground precision stock

Chemical Composition Comparison

| Grade | C% | Si% | Mn% | P% | S% | Other |
|-------|-----------|-----------|-----------|-------|-------|-----------------|
| EN8 | 0.36-0.44 | 0.10-0.40 | 0.60-1.00 | ≤0.05 | ≤0.05 | |
| EN8A | 0.36-0.44 | 0.10-0.40 | 0.60-1.00 | ≤0.05 | ≤0.05 | Improved purity |

| Grade | C% | Si% | Mn% | P% | S% | Other |
|-------|-----------|-----------|-----------|-------|-------|----------------------------------|
| EN8B | 0.36-0.44 | 0.10-0.40 | 0.60-1.00 | ≤0.05 | ≤0.05 | Lead added |
| EN8C | 0.36-0.44 | 0.10-0.40 | 0.60-1.00 | ≤0.05 | ≤0.05 | Sulfur increased |
| EN8D | 0.36-0.44 | 0.10-0.40 | 0.60-1.00 | ≤0.05 | ≤0.05 | Controlled Mn |
| EN8M | 0.36-0.44 | 0.10-0.40 | 0.90-1.50 | ≤0.05 | ≤0.05 | Higher Mn |
| EN8DM | 0.36-0.44 | 0.10-0.40 | 0.90-1.50 | ≤0.05 | ≤0.05 | Higher Mn + controlled chemistry |

Key Variations:

- **EN8B:** Contains lead (Pb) for improved machinability
- **EN8C:** Higher sulfur for better chip formation
- **EN8M/EN8DM:** Increased manganese for better hardenability

Mechanical Properties (Normalized Condition)

| Grade | Tensile (MPa) | Yield (MPa) | Elongation (%) | Hardness (BHN) |
|-------|---------------|-------------|----------------|----------------|
| EN8 | 700-850 | 460 | 14 | 201-255 |
| EN8A | 700-850 | 460 | 14 | 201-255 |
| EN8B | 700-850 | 460 | 14 | 201-255 |
| EN8C | 700-850 | 460 | 14 | 201-255 |
| EN8D | 700-850 | 460 | 14 | 201-255 |
| EN8M | 800-950 | 550 | 12 | 248-302 |
| EN8DM | 800-950 | 550 | 12 | 248-302 |

EN8M/EN8DM offer 15-20% higher strength due to increased manganese

Key Differences & Applications

1. Machinability Comparison

- **Best Machinability:** EN8B (lead added) > EN8C (sulfur added) > Standard EN8
- **EN8M/EN8DM:** Require more power but maintain good tool life

2. Heat Treatment Response

- **EN8M/EN8DM:** Achieve deeper hardening (ideal for large sections)
- **Standard EN8:** Suitable for smaller components

3. Recommended Uses

- **EN8/EN8A:** General engineering components, shafts, bolts
- **EN8B/EN8C:** High-volume machined parts (gears, fittings)
- **EN8M/EN8DM:** Heavy-duty gears, high-stress components

Equivalents & Alternatives

| Grade | AISI | DIN | ISO |
|-------|------|--------|-----|
| EN8 | 1040 | 1.0511 | C40 |
| EN8M | 1045 | 1.1191 | C45 |

For better machinability: **EN1A (free-cutting steel)**

Selection Guide

- **General purpose:** EN8/EN8A
- **Mass machining:** EN8B/EN8C
- **Heavy sections/strength:** EN8M/EN8DM

Steelmet Industries provides:

- All EN8 variants in stock
- Custom heat treatment (quenching & tempering)
- Precision ground bars (h9 tolerance)

• **Contact our technical team** for grade recommendations.

Conclusion

While all EN8 grades share similar base composition, subtle variations significantly impact their performance in machining, heat treatment, and final applications.

Steelmet Industries maintains ready stock of all EN8 variants from standard EN8 to specialty EN8DM. Request a quote for your specific requirements.

Category

1. BS970 1955 EN8 Steel and variants

Tags

1. EN8A
2. EN8B
3. EN8C
4. EN8D
5. EN8DM
6. EN8M
7. engineering steel
8. medium carbon steel
9. steel grade comparison
10. Steelmet Industries

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