



EN 10083-2 C18E vs. EN 10277 C18 vs. EN 10278 C15E Steel: Composition, Differences, and Equivalences

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Introduction

When selecting the right steel grade for your project, understanding subtle differences in composition and standards is crucial. **EN 10083-2 C18E**, **EN 10277 C18**, and **EN 10278 C15E** are widely used in automotive, machinery, and general engineering—but how do they compare?

This guide breaks down their **chemical composition, similarities, key differences, and potential equivalences**. Plus, discover how **SteelMet Industries** provides these grades in **multiple shapes, sizes, and conditions** to meet your specific needs.

Chemical Composition Comparison

Element (%)	EN 10083-2 C18E	EN 10277 C18	EN 10278 C15E
Carbon (C)	0.15 ~ 0.21	0.15 ~ 0.21	0.12 ~ 0.18
Silicon (Si)	0.15 ~ 0.40	~ 0.40	~ 0.40
Manganese (Mn)	0.60 ~ 0.90	0.60 ~ 0.90	0.60 ~ 0.90
Phosphorus (P)	~ 0.025	~ 0.035	~ 0.035
Sulfur (S)	~ 0.025	~ 0.035	~ 0.035
Chromium (Cr)	~ 0.40	~ 0.40	~ 0.40
Other Elements	~	~	Lead (Pb) may be added

Key Takeaway: While **C18E** and **C18** are nearly identical chemically, **C15E** has slightly lower carbon and may include lead for machinability.

Key Similarities & Differences

Similarities:

- **Medium-carbon steels** Good balance of strength and formability.
- **Manganese & Silicon ranges** Comparable across all three grades.
- **General applications** Used in gears, shafts, bolts, and structural components.

Differences:

- **EN 10083-2 C18E** Stricter **P & S limits** ($\leq 0.025\%$), optimized for **quenching & tempering**.
- **EN 10277 C18** Designed for **bright steel products** (cold-finished bars).
- **EN 10278 C15E** Lower carbon (0.12-0.18%) and may contain **lead** for **free-cutting applications**.

Equivalences & Alternative Grades

- **EN 10083-2 C18E** EN 10277 C18 (chemically similar, different processing standards).
- **EN 10278 C15E** is similar to **AISI 1117 (lead-free)** or **12L14 (lead)** for machining.

Which Steel Grade Should You Choose?

- **Need high strength after heat treatment?** EN 10083-2 C18E
- **Precision bright steel components?** EN 10277 C18
- **Superior machinability?** EN 10278 C15E

At SteelMet Industries, we supply these steel grades in:

- Round bars, flat bars, hex bars
- Cold-drawn, turned, or precision-ground
- Custom sizes & conditions (annealed, hardened, etc.)

• **Contact us today** for a quote tailored to your project requirements!

Conclusion

Understanding the differences between **EN 10083-2 C18E**, **EN 10277 C18**, and **EN 10278 C15E** helps in selecting the right material for durability, machinability, or heat treatment.

SteelMet Industries stocks these grades in **multiple forms and conditions** ensuring you get the exact steel solution for your application.

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1. Posts

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1. EN 10083-2 C18E
2. EN 10277 C18
3. EN 10278 C15E
4. engineering steel
5. Machinable Steel
6. medium carbon steel
7. steel chemical composition
8. steel grades comparison
9. Steelmet Industries

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26/05/2026

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