

## Bending Performance of MS, SAE 1010, SAE 1015, SAE 1018, and IS 2062 E250 – A Practical Comparison

### Description

When it comes to bending operations in fabrication, forming, and machining industries, **selecting the right steel grade** can make a noticeable difference in output quality, rejection rates, tool life, and operator effort.

This article compares the **bending behavior** of five commonly used **low-carbon steels**:

- Mild Steel (MS)
- SAE 1010
- SAE 1015
- SAE 1018
- IS 2062 E250

## Table 1: Steel Grades Compared: Bending Properties

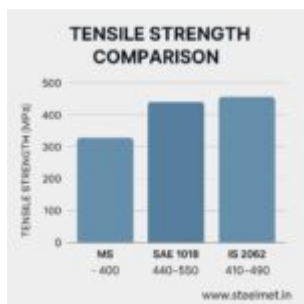
Property / Grade	MS (Generic)	SAE 1010	SAE 1015	SAE 1018	IS 2062 E250 (Fe410W)
Carbon Content (%)	~0.15 max	~0.08-0.13	~0.13-0.18	~0.15-0.20	~0.20 max
Ductility	High	Very High	High	Moderate	Moderate

Property / Grade	MS (Generic)	SAE 1010	SAE 1015	SAE 1018	IS 2062 E250 (Fe410W)
<b>Tensile Strength (MPa)</b>	~350-410 (approx)	~330-420	~380-450	~440-500	~410
<b>Yield Strength (MPa)</b>	~250 max	~170-250	~200-280	~250-320	~250
<b>Cold Bending Suitability</b>	Very Good	Excellent	Very Good	Good	Moderate (lot-dependent)
<b>Springback After Bend</b>	Low	Very Low	Low	Moderate	Moderate to High
<b>Crack Risk at Tight Radius</b>	Low	Very Low	Low	Medium	Medium to High
<b>Surface Finish After Bend</b>	Depends on source	Good	Good	Good	Moderate (scaly finish)
<b>Availability in Bright Form</b>	Limited	Available	Available	Widely Available	Mostly hot rolled
<b>Typical Uses</b>	General bending, brackets	Automotive parts, deep draw	Tubes, mild bend parts	Shafts, CNC precision parts	Structural fabrication

**CHEMICAL COMPOSITION**

SAE 1018	C: 0.15-0.30% Mn: 0.60-0.90% S: ≤ 0.030%
IS 2062	C: 0.23% Mn: 0.30-1.50% S: ≤ 0.045
MS	C: 0.05-0.25% Mn: 0.25-0.80% S: ≤ 0.030

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## What the Data Means for Bending Applications

### 1. Best for Tight Radius Bending: SAE 1010

- Lowest carbon content → high ductility
- Minimal springback
- Highly suited for sharp, deep, and small-radius bends

### 2. General Purpose Bending: MS and SAE 1015

- **Mild Steel (MS)** is easy to source, economical, and ductile

- **SAE 1015** has slightly higher strength but retains good bendability

Use these when:

- You're forming medium-radius parts
  - Cost is a constraint
  - Bright finish is not critical
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### • 3. Use with Caution: SAE 1018

- Cold drawn 1018 may be harder and exhibit springback
- May crack under tight radius unless annealed
- Great dimensional control, but not ideal for sharp bends unless softened

Best used for:

- **Precision forming**, CNC bending, or applications requiring higher strength after bending
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### • 4. Least Preferred for Critical Bends: IS 2062 E250

- Designed as a structural steel—**not optimized for forming**
- Surface is rougher and ductility is variable across heats
- More prone to **cracking or wrinkling** at tight bend radii

Use this for:

- Gradual bends
- Heavy fabrication where tolerances are relaxed

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## • Cold Drawn vs Hot Rolled Impact on Bending

- **Bright Bars (cold drawn):** Higher strength & more springback & risk of surface cracks in tight bends
- **Black Bars (hot rolled):** Softer, easier to bend, but lower dimensional accuracy and poorer finish

For tight bends using bright bars like 1018: **annealing before bending** is strongly recommended.

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## Conclusion

Choosing the right steel grade for bending is about **understanding the trade-off** between:

- **Strength vs Ductility**
- **Surface finish vs Formability**
- **Cost vs Performance**

Application Type	Best Grades
Sharp bends, deep draw	SAE 1010, SAE 1015
Manual bending	Mild Steel (MS), SAE 1010
CNC / Precision press brake	SAE 1018 (annealed)
Structural bending	IS 2062 E250

When in doubt, always validate with a **trial bend** and check the **heat-specific test certificate (TC)**.

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*Steelmet Industries - Bright Bars, Alloy Steels, Free Cutting Steels, Stainless Steels*