Tolerances for cold drawn bar							
Section	Size, diameter or width across flats				Permitted variation		
	mm				mm		
Round	≥	6	≤	18	+0	to	-0.070
	>	18	≤	30	+0	to	-0.085
	>	30	≤	50	+0	to	-0.100
	>	50	≤	80	+0	to	-0.120
	>	80	≤	100	+0	to	-0.140
Square and hexagon	≥	6	≤	18	+0	to	-0.090
	>	18	≤	30	+0	to	-0.110
	>	30	≤	50	+0	to	-0.130
	>	50	≤	80	+0	to	-0.160
	>	80	≤	105	+0	to	-0.250
Flat (width)	<	18			+0	to	-0.110
	>	18	≤	30	+0	to	-0.130
	>	30	≤	50	+0	to	-0.160
	>	50	≤	80	+0	to	-0.190
	>	80	≤	100	+0	to	-0.220
	>	100	≤	130	+0	to	-0.350
	>	130	≤	160	+0	to	-1.000
	>	160	≤	320	+1.0	to	-1.000
Flat (thickness)	<	18			+0	to	-0.110
	>	18	≤	30	+0	to	-0.130
	>	30	≤	50	+0	to	-0.250
	>	50	≤	80	+0	to	-0.350

Comparing Global Tolerance Systems for Steel Bright Bars: A Buyerâ??s Reference Guide

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

Description

What makes things more complex is that different countries use **different tolerance systems**: ISO (Europe), ANSI (USA), IS (India), JIS (Japan) â?? all with distinct notations and bands.

This guide compares the most common **tolerance systems used globally** for **bright steel bars** and explains how **Steelmet Industries** helps companies match the right tolerances for their applications.

Why Tolerances Matter in Bright Bars

- Ensure **interchangeability** of parts
- Avoid **fitment issues** (too tight or too loose)
- Reduce **machining time** and **rework**
- Maintain **tool life**
- Avoid costly **rejections**

Choosing the correct tolerance grade â?? like h9 or h11 â?? is crucial to achieving optimal functionality without overpaying for unnecessary precision.

Major Tolerance Systems in the World

Region	Standard	Notation Example	Typical Use Case
Europe/Global	ISO 286	h9, h11, k12	Engineering, CNC parts
USA	ANSI B89.1	Â±0.001â?³, Class ZZ	Precision shafts, inch drawings
Japan	JIS B0401	H9, js10	High-accuracy parts
India	IS 9550	CD/PD bars	Domestic machining, general fit

ð??? Tolerance Table for Bright Steel Bars (Reference Sizes)

ð??• Note: These values are typical and simplified for reference. Always refer to full standards for design-critical applications.

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ð??µ Rounds

Section	Size Range (mm / inch)	Standard	Grade	Tolerance Band	Total Variation	Notes
Round	3â??6 mm / 0.12â??0.24â?³	ISO 286	h9	+0 / -0.027 mm	0.027 mm	Small shafts
Round	10â??18 mm / 0.39â??0.71â?³	ISO 286	h9	+0 / -0.036 mm	0.036 mm	CNC turning
Round	18â??30 mm / 0.71â??1.18â?³	ISO 286	h11	+0 / -0.090 mm	0.090 mm	General use
Round	30â??50 mm / 1.18â??2.00â?³	ISO 286	h11	+0 / -0.110 mm	0.110 mm	Shafts, pins
Round	50â??100 mm / 2.00â??3.94â?³	ISO 286	h11	+0 / -0.130 mm	0.130 mm	Larger parts
Round	All sizes	IS 9550	CD	~h11	Â±0.11â??0.13 mm	Cold drawn
Round	All sizes	IS 9550	PD	~h10	Â±0.07â??0.09 mm	Peeled bars
Round	0.25â??2â?³	ANSI	Class ZZ	Â±0.0012â?³	0.060 mm	Inch tolerances

â?¼ï¸• Squares

Section	Size Range (mm / inch)	Standard	Grade	Tolerance Band	Total Variation	Notes
Square	6â??25 mm / 0.24â??1.00â?³	ISO 286	h11	+0 / -0.13 mm	0.13 mm	Drawn squares

Section	Size Range (mm / inch)	Standard	Grade	Tolerance Band	Total Variation	Notes
Square	All sizes	IS 9550	CD	~h11	0.16 mm	Indian std
Square	0.5â??1.5â?³	ANSI	Â±0.0015â?³	Â±0.0015â?³	0.076 mm	Square bars US spec

â¬¢ Hexagons

Section	Size (mm A/F)	Standard	Grade	Tolerance Band	Total Variation	Notes
Hex	6â??20 mm	ISO 286	h11	+0 / -0.11 mm	0.11 mm	Fasteners, bolts
Hex	All sizes	IS 9550	CD	~h11	0.13 mm	Indian hex bar

â? Flats

Section	Width x Thickness (mm)	Standard	Grade	Tolerance Band	Total Variation	Notes
Flat	10â??50 mm wide	ISO 286	h11	+0 / -0.20 mm	0.20 mm	Width control
Flat	3â??10 mm thick	ISO 286	h11	+0 / -0.12 mm	0.12 mm	Thickness control
Flat	All sizes	IS 9550	CD	~h11	~0.15 mm	Flat bars general use

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ð?§ Glossary of Key Terms

Term	Meaning
h9 / h11	ISO tolerance grades for outer dimensions
CD Bar	Cold drawn bright bar
PD Bar	Peeled bar, more precise and smoother
Ra	Surface roughness average (lower is smoother)
Total Variation	Difference between max and min permissible diameter

â•? FAQ

Q1. What is the difference between h9 and h11 tolerance grades?
A: h9 is a tighter tolerance used for precision applications; h11 is more general-purpose and cost-effective.

Q2. Are tolerances the same for rounds and flats?
A: No, width and thickness may have separate tolerance bands, especially in flats.

Q3. Can Steelmet match ANSI (inch) tolerances?
A: Yes. We routinely supply inch-dimension bars with ANSI tolerances for US-bound components.

Q4. How are tolerance inspections carried out?
A: Using calibrated micrometers, vernier calipers, and batchwise checks; reports can be shared on request.

Q5. Can custom tolerance bands be produced?
A: Absolutely. We deliver bright bars with per-face tolerances for special profiles and custom needs.

ð??§ How Steelmet Industries Delivers Global Tolerance Solutions

Steelmet Industries – Bright Bars, Alloy Steels, Free Cutting Steels, Stainless Steels

Steelmet Industries provides:

â? Bright bars in **ISO h9 to h13**, ANSI, JIS, and IS tolerances
â? Sizes from **3 mm to 100 mm** â?? rounds, flats, hex, square
â? **Custom profiles** with per-face tolerance bands
â? Full traceability with MTCs and dimensional inspection reports
â? **In-house QC** with NABL-calibrated tools
â? Quick response to **customer drawings and specs**

ð?? ï¸• *Real-World Example:*
A European automotive component buyer needed h9 tolerance bars for critical spindle fitment. Their previous supplier shipped h11 bars, leading to press-fit failure. Steelmet Industries quickly supplied verified h9 bright bars with micrometer report, resolving the issue without any design change.

ð??? Call to Action

ð??• **Looking for globally compliant bright bars?**
At Steelmet Industries, we understand that **tolerance isnâ??t just a number** â?? itâ??s the foundation of your productâ??s performance.
Visit ð??? www.steelmet.in or reach out to us to discuss your bright bar requirements with our technical team.

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