Mechanical Property Comparison of 304 and 316 Stainless Steel

This page compares common mechanical-property baselines, fabrication response, and welded-grade notes in a cleaner Octal technical-reference layout.

Property / technical point	304 stainless steel	316 stainless steel	Technical reading
Tensile strength, min.	**515 MPa**	**515 MPa**	No meaningful headline difference in minimum tensile requirement under the cited flat-rolled product data.
Yield strength, 0.2% proof, min.	**205 MPa**	**205 MPa**	Base structural level is essentially the same in annealed condition.
Elongation in 50 mm, min.	**40%**	**40%**	Both grades retain high ductility and are widely used where forming is required.
Rockwell B hardness, max.	**92 HRB**	**95 HRB**	316 is allowed a slightly higher maximum hardness in the cited grade sheet.
Brinell hardness, max.	**201 HB**	**217 HB**	Again, a small difference, but not usually the main selection driver.
Strengthening method	Cold-work strengthened in practice	Cold-work strengthened in practice	Neither grade is normally selected because of a heat-treatment strength advantage.
Heat treatment response	Not hardened by thermal treatment	Not hardened by thermal treatment	Both are austenitic stainless steels; annealing is used for solution treatment, not for hardening in the structural-alloy sense.
Weldability	Good	Good	Both are commonly welded, but welding procedure, filler choice, and section thickness still matter.
Low-carbon welded option	**304L** commonly used where welding and intergranular corrosion control are important	**316L** commonly used for the same reason in more corrosive service	The "L" grades matter more in welded fabrication than a simple 304 vs 316 label alone.
Dual-certified stock	304 / 304L dual certification is common in plate, pipe, and round bar	316 / 316L dual certification is also common in plate, pipe, and round bar	Actual delivered stock often needs to be checked against the material test certificate, not assumed from a short grade description.

Mechanical Properties vs Corrosion Selection Logic

This page keeps the same Octal table system and separates selection logic from baseline mechanical data for clearer technical reading.

Comparison point	Mechanical reading	Corrosion / selection reading
Tensile strength	**304** and **316** are both commonly listed at **515 MPa minimum** in standard annealed flat-rolled grade sheets.	Since the base tensile level is essentially the same, grade selection usually shifts to corrosion environment rather than headline strength.
Yield strength	Both grades are commonly listed at **205 MPa minimum 0.2% proof strength**.	The small practical difference in many projects is not structural capacity first, but how much corrosion margin the environment demands.
Elongation / ductility	Both grades are commonly listed at **40% minimum elongation** in annealed condition.	Because both remain highly formable, fabrication route alone often does not justify moving from 304 to 316.
Hardness	304 is commonly listed around **92 HRB / 201 HB max**, while 316 is commonly listed around **95 HRB / 217 HB max** in common grade sheets.	This is a secondary difference. It is usually less important than chloride exposure, deposits, crevices, and cleaning chemistry.
Strengthening route	Both grades are **austenitic** and are generally strengthened by **cold work**, not by conventional heat-treatment hardening.	Since neither grade is chosen mainly for a heat-treatment strength advantage, the more relevant separator remains corrosion performance.
Corrosion driver	Mechanical-property baseline is similar enough that it does not usually decide the grade by itself.	**316** contains **molybdenum**, which improves resistance to pitting and crevice corrosion, especially in chloride-bearing service.
Mild indoor or low-chloride service	Mechanical similarity means either grade can often satisfy the base structural requirement.	In these conditions, **304** is often technically sufficient because the added corrosion margin of 316 may not be decisive.
Coastal, salt-bearing, or harsher washdown service	Mechanical similarity still remains.	This is where **316** usually becomes the more appropriate starting grade, because the selection is being driven by corrosion risk, not a large mechanical upgrade.