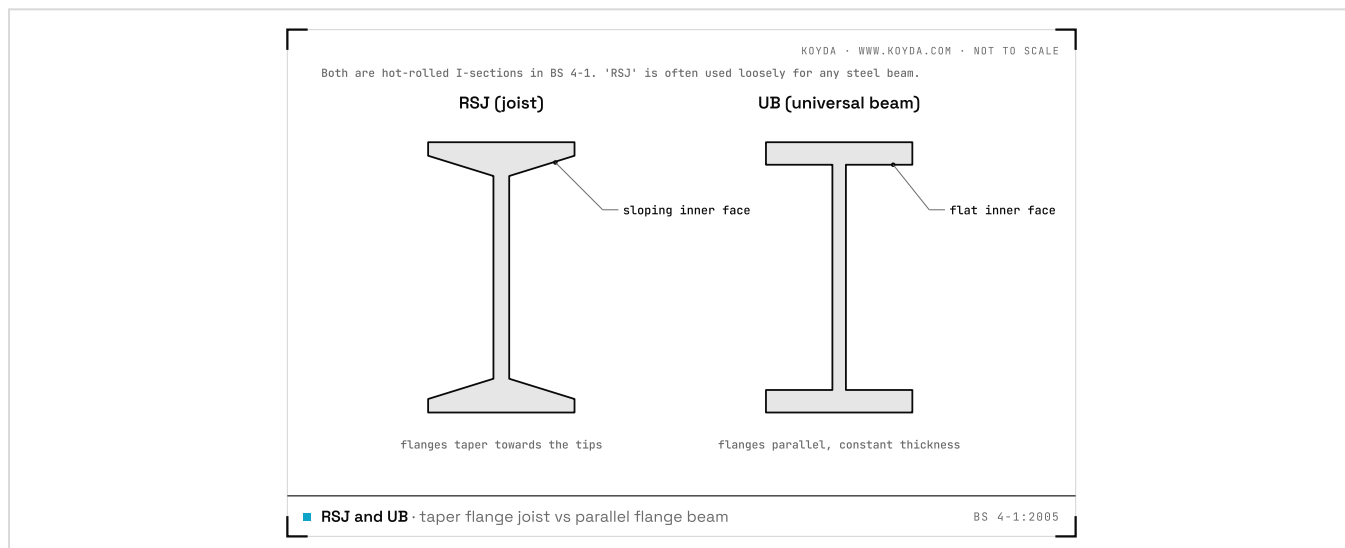


■ TECHNICAL GUIDE • QUICK REFERENCE

S275 vs S355 Steel Grades, and RSJ vs UB

S275 and S355 are structural steel grades to BS EN 10025-2. The number is the minimum yield strength in N/mm² for material up to 16mm thick: 275 and 355. S355 is about 29% stronger in yield for a similar density and stiffness, so it can allow lighter members. Yield strength falls slightly as thickness increases. The suffix (JR, J0, J2, K2) sets the impact toughness.

PROPERTY	S275	S355	SOURCE
Yield strength, $t \leq 16\text{mm}$	275 N/mm ²	355 N/mm ²	BS EN 10025-2
Yield, $16 < t \leq 40\text{mm}$	265 N/mm ²	345 N/mm ²	BS EN 10025-2
Yield, $40 < t \leq 63\text{mm}$	255 N/mm ²	335 N/mm ²	BS EN 10025-2
Yield, $63 < t \leq 80\text{mm}$	245 N/mm ²	325 N/mm ²	BS EN 10025-2
Tensile strength (min), $3 < t \leq 100\text{mm}$	410 N/mm ²	470 N/mm ²	BS EN 10025-2
Modulus of elasticity E	210,000 N/mm ²	210,000 N/mm ²	BS EN 1993-1-1
Density	7,850 kg/m ³	7,850 kg/m ³	BS EN 1991-1-1



Toughness sub-grades

SUB-GRADE	CHARPY IMPACT ENERGY	TEST TEMPERATURE
JR	27J	+20°C
J0	27J	0°C
J2	27J	-20°C
K2	40J	-20°C

A full designation reads, for example, S355J2+N: grade S355, sub-grade J2, delivered normalised or normalised rolled. Hollow sections to BS EN 10210-1 use similar designations, with an H suffix.

Other properties used in design

- Shear modulus $G \approx 81,000 \text{ N/mm}^2$; Poisson's ratio $\nu = 0.3$.
- Coefficient of thermal expansion $\alpha = 12 \times 10^{-6}$ per °C.
- The UK National Annex to BS EN 1993-1-1 lets designers use the minimum yield strength for the actual thickness as f_y .

RSJ vs UB

- RSJ (rolled steel joist): a hot-rolled I-section with flanges that taper towards the tips. BS 4-1 lists these as joists.
- UB (universal beam): a hot-rolled I-section with parallel flanges, much deeper than it is wide. Parallel flanges make bolting and welding simpler.
- UC (universal column): like a UB but with flange width close to the depth, for columns.
- On site and in quotes, 'RSJ' usually means 'a steel beam'. For pricing and fabrication, use the full designation, for example 203 × 133 × 25 UB S355.

See the UB section table and the steel weight calculator.

Common questions

What is the difference between S275 and S355 steel?

The minimum yield strength: 275 N/mm² for S275 and 355 N/mm² for S355, for material up to 16mm thick. Both have the same density and stiffness, so S355 carries more load before yielding but deflects the same amount under the same load.

Is S355 more expensive than S275?

S355 usually costs a little more per tonne, but because it is stronger the designer can often use a lighter section. S355 is now widely used for hot-rolled sections in UK building structures. Ask your supplier for current prices and availability.

What do JR, J0, J2 and K2 mean?

They are impact toughness sub-grades. JR, J0 and J2 need 27J in a Charpy test at +20°C, 0°C and -20°C respectively. K2 needs 40J at -20°C. The engineer chooses the sub-grade using BS EN 1993-1-10, based on thickness, stress and the lowest service temperature.

Sources

1. SteelConstruction.info: steel material properties (BS EN 10025-2 yield and tensile strengths, sub-grades, E, G, v, α) · https://www.steelconstruction.info/Steel_material_properties
2. BS EN 10025-2:2019 hot rolled products of structural steels: non-alloy structural steels (BSI)
3. BS 4-1:2005 structural steel sections: specification for hot-rolled sections (BSI)
4. BS EN 1993-1-1 and UK National Annex: design of steel structures (BSI)

Full guide: www.koyda.com/guides/s275-vs-s355-steel-grades/

Need steelwork designed, fabricated and installed? Send us your drawings.

Koyda Ltd
 Units 27-29 Jesmor Farm, St Piers Lane
 Lingfield, Surrey RH7 6PN

Email: joe@koyda.com
 Phone: 07753 213617
 Web: www.koyda.com · Mon-Fri 07:00-17:00

General guidance only, not design advice for a specific project. Figures checked against the sources listed in October 2026; standards and guidance change, so check the current edition and get project-specific advice from a competent designer. Koyda Ltd accepts no liability for decisions made using this sheet. Free to share, kept complete and unaltered. Full guide: www.koyda.com/guides/s275-vs-s355-steel-grades/ · KOY-GRD-001 · Rev A · © Koyda Ltd, company no. 05632312.