Structural Steel Plate, Beams, Columns, Channels, Angles - S275, S355

S275 – a structural grade steel with a minimum yield strength of 275 N/mm²

S355 – a structural grade steel with a minimum yield strength of 355 N/mm²

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S275 suitable for numerous general engineering and structural applications

S275 & S275JR steel can be supplied in plate, round bar and flat bar. S275 provides a lower strength (than S355) but has good machinability and can be welded. The average minimum yield for S275 steel is 275 N/mm² giving its name: S275.

BS EN 10025 S275 & S275JR supersedes BS4360 43A and 43B

S355 is often used in the most demanding environments such as the offshore industry.

S355, S355JR, S355J2, S355J2+N steel in plate, round bar, flat bar and blocks. S355 steel is a low carbon steel whose specifications offer high yield strength. The average minimum yield for S355 steel is 355 N/mm² giving its name: S355.

BS EN 10025 S355, S355JR, S355J2 and S355J2+N supersedes BS4360 50A, 50B, 50C 50D

- **Hot Finished** Structural Hollow Sections to **EN10210** S355J2H/S355NH
- **Hot Finished** Seamless Structural Hollow Sections to **EN10210** S355J2H/S355NH

- **Cold Formed** Hollow Sections to **EN10219** S275J2H/S355J2H
- **Cold Formed** Circular Hollow Sections to **EN10219** S275J2H/S355J2H

Keywords
Brittle fracture, sub-grades, JR, J0, J2

Synopsis
After the replacement of BS 4360 by EN 10025 and EN 10113, structural steel grades and sub-grades are specified using a different system to designate different steel quality. In general engineering design works, the steel grades and sub-grades are specified by the Responsible Engineer, and all we have to do is to procure the steel grades and sub-grades specified. However, in Contractor's design, we should understand in greater detail the design implication of different steel sub-grades, noting over-specified steel sub-grades by Contractor's Designers might lead to difficulty in timely procurement.

A steel of high strength and low ductility is brittle. Brittle fracture can occur in steel components/structures subject to tensile stresses in low temperature. In certain situations where inappropriate fabrication conditions or low toughness weld materials are used, brittle fracture can also occur at normal temperature. The problem is mitigated by specifying steel and welded joints with appropriate grades of facture toughness (or steel quality).

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The following tables show the most common steel grades and sub-grades with their former grade designation in BS 4360 for reference.

EN1025	BS4360	EN10025	BS4360
S275 JR	Grade 43B	S355JR	Grade 50B
S275 J0	Grade 43C	S355J0	Grade 50C
S275 J2	Grade 43D	S355J2	Grade 50D

Sub-Grades JR, J0, J2

Steel sub-grades indicate the Charpy impact value required to prevent brittle fracture.
JR – Longitudinal Charpy V-notch impacts 27J at **R**oom temp
J0 – Longitudinal Charpy V-notch impacts 27J at **0**°C
J2 – Longitudinal Charpy V-notch impacts 27J at -**2**0°C

Comparing to JR, J0 & J2 quality steels are able to exhibit the same level of ductility (i.e., absorbing 27J impact energy) at lower temperatures (i.e., 0°C & -20°C). It means that these steels are of better quality against brittle fracture, and hence more expensive.
The following tables give an indication of the percentage increase in material cost relative to S275 JR

Steel Grade	£% Extra	Steel Grade	£% Extra
S275 JR	0	S355 JR	3 %
S275 J0	3.5 %	S355 J0	4 %
S275 J2	4 %	S355 J2	10%*

In very general terms, JR steel material is most readily available from stock and mill. It is also the lowest priced sub-grade and so for maximum economy and availability, JR quality material should be used whenever possible. Higher quality materials, J0 and J2, are not normally held in stock and might need ordering directly from the mill. Time allowance for this should be made in the procurement programme
*Small quantity orders carry a vastly inflated % cost sometime up to 10x a S275 piece carries.

Abbreviations

+AR As rolled.