

MACSTEEL

An abbreviated guide to

Structural steel standard

SANS 50025 / EN 10025:2004

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SANS 50025 / EN 10025:2004

The new South African standard for structural steel

The standard is published in six parts and combines together earlier standards to produce one standard for the majority of structural steel products.

The parts are:

SANS 50025 / EN 10025-1:2004	General technical delivery conditions.
SANS 50025 / EN 10025-2:2004	Technical delivery conditions for non-alloy structural steels. <i>(Supersedes EN 10025:1993)</i>
SANS 50025 / EN 10025-3:2004	Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels. <i>(Supersedes EN 10113 parts 1 & 2:1993)</i>
SANS 50015 / EN 10025-4:2004	Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels. <i>(Supersedes EN 10113-1,-2:1993)</i>
SANS 50025 / EN 10025-5:2004	Technical delivery conditions for structural steels with improved atmospheric corrosion resistance. <i>(Supersedes EN 10155:1993)</i>
SANS 50025 / EN 10025-6:2004	Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition. <i>(Supersedes EN 10137-1,-2:1996)</i>

History of the standard.

The European Committee for Iron and Steel Standardisation is responsible for producing the European Standards (ENs) for structural steels. The first of these standards, EN 10025, was published in the UK by BSI (British Standards Institute) as EN 10025 : 1990, partly superseding BS 4360 : 1986, which was reissued as BS 4360 : 1990. In 1993, a second edition of EN 10025 was made available together with EN 10113 : parts 1, 2 & 3 and EN 10155. In June 1994, EN 10210 : part 1 was published and at the same time BS 4360 was officially withdrawn. The balance of the BS 4360 steels not affected by these EN's were re-issued in new British Standards BS 7613 and BS 7668. In 1996, with the publication of EN 10137, BS 7613 was withdrawn

In 2008, it was resolved to adopt the latest edition of the EN 10025 series as the South African National Standard to replace SANS 1431. EN 10025 standards were officially published in 2009 as SANS 50025 / EN10025.

Grade designation systems

The designation systems used in the new standard are similar but not identical to EN 10025:1993.

Symbols used in SANS 50025 / EN 10025-2:2004

Non-alloy structural steels.

- S Structural steel.
- E Engineering steel.
- 235 Minimum yield strength (ReH) in MPa at 16mm
- JR Longitudinal Charpy V-notch impacts 27 J at + 20°C
- J0 Longitudinal Charpy V-notch impacts 27 J at 0°C
- J2 Longitudinal Charpy V-notch impacts 27 J at - 20°C
- K2 Longitudinal Charpy V-notch impacts 40 J at - 20°C
- +AR Supply in as rolled conditions
- +N Supply in normalized/normalized rolled conditions

Customer options.

- C Grade suitable for cold forming
- Z Grade with improved properties perpendicular to the surface.

Examples: S275JR+AR, S355J2C+N

Symbols used in SANS 50025 / EN 10025-3:2004

Normalized/normalized rolled weldable fine grain structural steels.

- S Structural steel.
- 275 Minimum yield strength (ReH) in MPa at 16mm
- N Longitudinal Charpy V-notch impacts temp. not lower than -20°C
- NL Longitudinal Charpy V-notch impacts temp. not lower than -50°C

Customer options.

- Z Grade with improved properties perpendicular to the surface.

Examples S275N, S275NL

Grade designation systems

Symbols used in SANS 50025 / EN 10025-4:2004

Thermomechanical rolled weldable fine grain structural steels.

- S Structural steel.
- 275 Minimum yield strength (Reh) in MPa reference to 16mm
- M Longitudinal Charpy V-notch impacts temp. not lower than -20°C
- ML Longitudinal Charpy V-notch impacts temp. not lower than -50°C

Customer options.

- Z Grade with improved properties perpendicular to the surface.

Examples S355M, S355ML

Symbols used in SANS 50025 / EN 10025-5:2004

Structural steels with improved atmospheric corrosion resistance.

- S Structural steel.
- 355 Minimum yield strength (Reh) in MPa at to 16mm
- J0 Longitudinal Charpy V-notch impacts 27 J at 0°C
- J2 Longitudinal Charpy V-notch impacts 27 J at - 20°C
- K2 Longitudinal Charpy V-notch impacts 40 J at - 20°C
- W Improved atmospheric corrosion resistance
- P Greater phosphorus content (grade 355 only)
- +AR Supply in as rolled conditions
- +N Supply in normalized/normalized rolled condition

Customer options.

- Z Grade with improved properties perpendicular to the surface.

Examples S235J0W+AR, S355J2W+N

Grade designation systems

Symbols used in SANS 50025 / EN 10025-6:2004

Flat products of high yield strength structural steels in quenched and tempered condition.

- S Structural steel.
- 460 Minimum yield strength (Reh) in MPa at 16mm
- Q Longitudinal Charpy V-notch impacts temp. not lower than -20°C
- QL Longitudinal Charpy V-notch impacts temp. not lower than -40°C
- QL1 Longitudinal Charpy V-notch impacts temp. not lower than -60°C

Customer options.

- Z Grade with improved properties perpendicular to the surface.

Examples S460Q, S690QL



Grades, properties and nearest equivalents

The tables below show the grades, properties and nearest equivalent grades from earlier standards. The grade designations are explained on the previous pages.

Table 1.

SANS 50025 / EN 10025-2:2004

Non-alloy structural steels.

Comparison between grades in SANS 50025 / EN 10025-2:2004 and EN 10025:1993					
SANS 50025 / EN 10025-2:2004					EN 10025:1993
Grade	Yield (Reh) min	Tensile (Rm)	Charpy V-notch longitudinal		Grade
	Strength at t = 16mm (MPa)		Temp (°C)	Energy (J) t = 16mm	
S185	185	290 / 510	-	-	S185
- ¹	235	360 / 510	-	-	S235
S235JR ²			20	27	S235JRG2
S235J0			0	27	S235J0
S235J2			-20	27	S235J2G3 / G4
- ¹	275	410 / 560	-	-	S275
S275JR ²			20	27	S275RG2
S275J0			0	27	S275J0
S275J2			-20	27	S275J2G3 / G4
- ¹	355	470 / 630	-	-	S355
S355JR ²			20	27	S355JR
S355J0			0	27	S355J0
S355J2			-20	27	S355J2G3 / G4
S355K2			-20	40	S355K2G3 / G4
E295	295	470 / 610	-	-	E295
E335	335	570 / 710	-	-	E335
E360	360	670 / 830	-	-	E360

1. For all products to be compliant with the EU construction Products Directive (CPD 89/106/EC) the material must offer a guaranteed minimum impact performance. This resulted in the removal of this grade from the standard, and the lowest offered is the JR version for each yield strength variation.

2. Verification of the specified impact value is only carried out when agreed at the time of the enquiry and order.

Grades, properties and nearest equivalents

Table 2.

SANS 50025 / EN 10025-3:2004

Normalized/normalized rolled weldable fine grain structural steels.

Comparison between grades in SANS 50025 / EN 10025-3:2004 and EN 10113-2:1993					
SANS 50025 / EN 10025-3:2004					EN 10113-2:1993
Grade	Yield (ReH) min	Tensile (Rm)	Charpy V-notch longitudinal		Grade
	Strength at t = 16mm (MPa)		Temp (°C)	Energy (J) t = 16mm	
S275N	275	370 / 510	-20	40	S275N
S275NL			-50	27	S275NL
S355N	355	470 / 630	-20	40	S355N
S355NL			-50	27	S355NL
S420N	420	520 / 680	-20	40	S420N
S420NL			-50	27	S420NL
S460N	460	540 / 720	-20	40	S460N
S460NL			-50	27	S460NL

Grades, properties and nearest equivalents

Table 3.

SANS 50025 / EN 10025-4:2004

Thermomechanical rolled weldable fine grain structural steels.

Comparison between grades in SANS 50025 / EN 10025-4:2004 and EN 10113-3:1993					
SANS 50025 / EN 10025-4:2004					EN 10113-3:1993
Grade	Yield (Reh) min	Tensile (Rm)	Charpy V-notch longitudinal		Grade
	Strength at t = 16mm (MPa)		Temp (°C)	Energy (J) t = 16mm	
S275M	275	370 / 530	-20	40	S275M
S275ML			-50	27	S275ML
S355M	355	470 / 630	-20	40	S355M
S355ML			-50	27	S355ML
S420M	420	520 / 680	-20	40	S420M
S420ML			-50	27	S420ML
S460M	460	540 / 720	-20	40	S460M
S460ML			-50	27	S460ML

Grades, properties and nearest equivalents

Table 4.

SANS 50025 / EN 10025-5:2004

Structural steels with improved atmospheric corrosion resistance.

Comparison between grades in SANS 50025 / EN 10025-5:2004 and EN 10155:1993					
SANS 50025 / EN 10025-5:2004					EN 10155:1993
Grade	Yield (Reh) min	Tensile (Rm)	Charpy V-notch longitudinal		Grade
	Strength at t = 16mm (MPa)		Temp (°C)	Energy (J) t = 16mm	
S235J0W	235	360 / 510	0	27	S235J0W
S235J2W			-20	27	S235J2W
S355J0WP	355	470 / 630	0	27	S355J0WP
S355J2WP			-20	27	S355J2WP
S355J0W	355	470 / 630	0	27	S355J0W
S355J2W			-20	27	S355J2W
S355K2W			-20	40	S355K2W

Grades, properties and nearest equivalents

Table 5.

SANS 50025 / EN 10025-6:2004

Flat products of high yield strength structural steels in quenched and tempered condition.

Comparison between grades in SANS 50025 / EN 10025-6:2004 and EN 10137-2:1996					
SANS 50025 / EN 10025-6:2004					EN 10137-2:1996
Grade	Yield (Reh) min	Tensile (Rm)	Charpy V-notch longitudinal		Grade
	Strength at t = 16mm (MPa)		Temp (°C)	Energy (J) t = 16mm	
S460Q	460	550 / 720	-20	30	S460Q
S460QL			-40	30	S460QL
S460QL1			-60	30	S460QL1
S500Q	500	590 / 770	-20	30	S500Q
S500QL			-40	30	S500QL
S500QL1			-60	30	S500QL1
S550Q	550	640 / 820	-20	30	S550Q
S550QL			-40	30	S550QL
S550QL1			-60	30	S550QL1
S620Q	620	700 / 890	-20	30	S620Q
S620QL			-40	30	S620QL
S620QL1			-60	30	S620QL1
S690Q	690	770 / 940	-20	30	S690Q
S690QL			-40	30	S690QL
S690QL1			-60	30	S690QL1
S890Q	890	940 / 1100	-20	30	S890Q
S890QL			-40	30	S890QL
S890QL1			-60	30	S890QL1
S960Q	960	980 / 1150	-20	30	S960Q
S960QL			-40	30	S960QL

Comparison table

Table 6: List of corresponding former national designations

BS 4360: 1986	Din 17100	EN 10025: 1993	SANS 1431	SANS 50025 / EN 10025
Gr 40 A				
	RSt 37-2	S 235 JRG2	240WA	S 235 JR
Gr 40 C	St 37-3 U	S 235 JO	240WC	S 235 JO
	St 37-3 N	S 235 J2G3 or G4		S235 J2
Gr 43 A				
Gr 43 B	St 44-2	S 275 JR		S 275 JR
Gr 43 C	St 44-3 U	S 275 JO		S 275 JO
	St 44-3 N	S 275 J2G3 or G4		S275 J2
None	None	None	300WA	None
Gr 50 A				
Gr 50 B		S 355 JR	350WA	S 355 JR
Gr 50 C	St 52-3 U	S 355 JO	350WC	S 355 JO
Gr 50 D	St 52-3 N	S 355 J2G3 or G4	350 WD	S355 J2
Gr 50 DD		S 355 K2G3 or G4	350 WD	S355 K2

Notes:

- JR = Impact @ room temperature (Optional)
- J0 = Impact @ Zero degrees (27J)
- J2 = Impact @ -20 degrees (27J)
- K2 = Impact @ -20 degrees (40J); (Also correspond to 27J @ -30 degrees)
- G2 = Rimmed steel is not permitted
- G3 = Normalised
- G4 = Supply condition at the manufacturers discretion