S45C Steel

Medium Carbon Steel · JIS G4051 · Nominal 0.45% C

S45C

CARBON	TENSILE (Q&T)	HARDNESS	EQUIVALENTS
0.42–0.48%	≥ 690 MPa	up to 269 HB	1045 · C45 · EN8

OVERVIEW

S45C is a plain 0.45% carbon steel to JIS G4051. It is stronger than mild steel yet still machines cleanly and hardens predictably, and it costs less than alloy grades like 4140 — which is why it is used across so much general machinery.

We manufacture it in our own hot-rolling mill and supply it hot rolled or as cold-drawn bright bar, with a mill test certificate on every dispatch.

EQUIVALENT GRADES

Standard	Designation
JIS (Japan)	S45C
AISI / SAE (USA)	1045
DIN / EN (Europe)	C45 / CK45 / 1.0503
BS 970 (UK)	EN8 / EN8D / 080M40
IS (India)	45C8

TYPICAL APPLICATIONS

Gears · Shafts · Axles · Spindles · Studs & bolts · Crane wheels · Hydraulic parts · Machine-tool parts

FORMS & SIZE RANGE

Rounds	23.5 – 80 mm
Bright bars (cold drawn)	22 – 63.5 mm
RCS	55, 63, 75 mm
Hexagons	23.5 – 52.5 mm

Custom sizes & cut lengths on request.

CHEMICAL COMPOSITION

Element	C	Si	Mn	P max	S max
wt %	0.42–0.48	0.15–0.35	0.60–0.90	0.035	0.035

Ladle analysis per JIS G4051.

MECHANICAL PROPERTIES

Property	Normalized	Q & T
Tensile strength	≥ 570 MPa	≥ 690 MPa
Yield strength	≥ 345 MPa	≥ 490 MPa
Elongation	≥ 20%	≥ 17%
Brinell hardness	167–229 HB	201–269 HB

Section-size dependent; confirmed on the mill test certificate.

HEAT TREATMENT

Process	Typical practice
Forging	850 – 1,100 °C
Normalizing	830 – 870 °C, air cool
Annealing	780 – 830 °C, furnace cool
Hardening	820 – 860 °C, water / oil quench
Tempering	550 – 660 °C, to properties

Induction / flame hardening of the surface: approx. 54 – 58 HRC over a tough core.