E STEEL SDN BHD (891338-A)

NO 3, Lorong Sungai Puloh 7/KU 6,
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1045 Carbon Steel , S45C, 1191, ASSAB 760, EN9, C45, 45C

AISI 1045 is a medium tensile low hardenability carbon steel generally supplied in the cold drawn or turned and polished condition, with a typical tensile strength range 600 - 950 Mpa and Brinell hardness range 179 - 280. in either condition.

Characterised by good strength and impact properties, with good machinability and reasonable weldability in the as supplied condition.

S45C has a low through hardening capability with sections up to around 60mm only generally recommended as suitable for through hardening and tempering. It can however be successfully flame or induction hardened in the as supplied condition resulting in surface hardnesses of up to Rc 54 - Rc 60 depending upon quenching medium employed, type of set up, section size etc. Core strengths will remain as supplied.

It does not however respond satisfactorily to nitriding due to a lack of suitable alloying elements.

EN9 is used extensively by all industry sectors for applications requiring more strength and wear resistance than the low carbon mild steels can provide and the higher strength of the low alloy high tensile steels is not necessary, plus those applications requiring flame or induction hardening.

DIN	AISI	JIS	Chemical Composition											
			C	Si	Mn	P	S	Co	Cr	Mo	Ni	V	W	Cu
CK45	1045	S45C	0.42 to 0.48	0.20 to 0.35	0.60 to 0.90	≤ 0.030	≤ 0.035	-	-	-	-	-	-	-

Common C45 Steel Specifications

Country	USA	British	Japan	Australia
Standard	ASTM A29	EN 10083-2	JIS G4051	AS 1442
Grades	1045	C45/1.1191	S45C	1045

Typical Mechanical Properties - Hot Rolled Condition

	Tensile Strength Mpa	Yield Strength Mpa	Elongation In 50mm %	Hardness Brinell HB
	570 - 700	300 - 450	14 - 30	170 - 210

Typical Mechanical Properties - Normalised Condition

	Tensile Strength Mpa	Yield Strength Mpa	Elongation in 50mm %	Impact Izod J	Hardness	
					HB	Rc
	640	410	22	54	187	10

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Forging

Pre heat to 750 °C - 800 °C, then continue heating to 1100 °C - 1200 °C maximum, hold until temperature is uniform throughout the section and commence forging immediately.
Do not forge below 850 °C
Finished forgings may be air cooled.

S45C Heat Treatment

Annealing

Heat to 800 °C - 850 °C hold until temperature is uniform throughout the section, and cool in furnace.

Flame or Induction Hardening

Heat as quickly as possible to the austenitic temperature range (820 °C - 860 °C) and required case depth followed by an immediate water or oil quench, depending upon hardness required, workpiece size/shape and quenching arrangements.
Following quenching to hand warm, most components should be tempered at 150 °C - 200 °C to remove quenching stresses in the case. This will have little effect on case hardness.

C45 steel Hardening

Heat to 820 °C - 850 °C hold until temperature is uniform throughout the section, soak for 10 - 15 minutes per 25mm of section, and quench in water or brine.
or:Heat to 830 °C - 860 °C soak as above and quench in oil.
Temper immediately while still hand warm.

45C steel Normalizing

Heat to 870 °C - 920 °C hold until temperature is uniform throughout the section, soak for 10 - 15 minutes.
Cool in still air.

Stress Relieving

Heat to 550 °C - 660 °C hold until temperature is uniform throughout the section, soak for 1 hour per 25mm of section, and cool in still air.

S45C steel Tempering

Re heat to 400 °C - 650 °C as required, hold until temperature is uniform throughout the section, soak for 1 hour per 25mm of section, and cool in still air.

1191 steel Machining

1191 carbon steel in the cold drawn or turned and polished condition has very good machinability and all operations such as turning, drilling, broaching, milling and tapping etc. can be carried out satisfactorily using machine manufacturers recommendations for suitable tool type, feeds and speeds.