Xometry

Datasheet

S50C

Description

S50C is a medium-carbon high-quality carbon structural steel defined by the Japanese JIS standard. It corresponds to China's GB Grade 50 steel and the US AISI 1050 standard, making it one of the most widely used medium-carbon steels in mechanical manufacturing. As a high-strength medium-carbon steel, S50C exhibits low plasticity during cold deformation and poor weldability and hardenability. However, it is free from temper brittleness and possesses fair machinability. It is used to manufacture mechanical parts and spring components that require high wear resistance, but are subjected to minimal dynamic loads and impact forces. Typical applications include forged gears, tie rods, rolling mill rolls, shafts, friction discs, agricultural plowshares, and heavy-duty mandrels.

Features

High strength & wear resistance; superior wear resistance compared to low-carbon steels. Good impact toughness at room temperature but has moderate low-temperature toughness; excellent fatigue resistance, making it suitable for components subjected to cyclic loads, such as shafts and gears; easy to machine after annealing or spheroidizing, but difficult to cut after quenching; poor weldability, with a high tendency for cold cracking, requiring preheating and post-weld heat treatment. Low cold forming plasticity: Poor cold bending and cold heading performance; mainly used for hot working.

Commonly applied in automotive body structures, frames, chassis, bridges, high-rise buildings, and mechanical equipment where high stability and load-bearing capacity are required.

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Parameters

Chemical Composition of S50C Steel (%)

Composition	C	Si	Mn	P	S	Cr	Ni	Cu	More
Min.	0.47	0.15	0.6	-	-	-	-	-	Cr+No≤0.35
Max.	0.53	0.35	0.9	0.03	0.035	0.2	0.2	0.3	

Mechanical Properties

Tensile strength σb(MPa): ⩾630(64)

Yield strength σs(MPa): ⩾375(38)

Impact toughness value αkv(J/cm2): ⩾39(4)

Hardness: Non-heat-treated, ⩽241HB; Annealed steel, ⩽207HB

Specimen size: 25mm

China		Taiwan, China	Japan	South Korea	USA		International Organization for Standardization	Germany	
GB	ISC	CNS	JIS	KS	ASTM/AISI	UNS	ISO	DIN EN/ DIN	W-Nr.
50	U20502	S50C	S50C	SM50C	1050	G10500	C50E4	C50E Ck53	1.1210