

EN47 / 51CrV4 Spring Steel

Chromium-vanadium spring steel · EN 10089 · 1.8159

MATERIAL DATASHEET

EN47 (51CrV4) is a chromium-vanadium spring steel. Vanadium refines the grain and improves fatigue strength and temper resistance, so the steel flexes repeatedly without taking a permanent set. It is supplied soft-annealed for machining and forming, then hardened and tempered as a finished part.

EQUIVALENT GRADES

BS 970	735A51 / 735A50
EN / DIN	51CrV4
Material no.	1.8159
AISI / SAE	6150
JIS	SUP10
IS (India)	50Cr4V2

READY STOCK IN MUMBAI

Round bar	Ø16–205 mm
Square bar	16×16 to 55×55 mm
Flat bar	28×36, 36×45, 45×55 mm
Supply condition	Annealed

Every dispatch comes with the mill test certificate for its heat. Minimum order 100 kg.

50CrV4 is the older DIN name for the same 1.8159 steel. In India both are traded as EN47, and the Indian Standard name is 50Cr4V2.

CHEMICAL COMPOSITION, %

	C	Si	Mn	P	S	Cr	V
As supplied: Indian mill range	0.45–0.55	max 0.50	0.50–0.80	max 0.050	max 0.050	0.80–1.20	min 0.15
Standard: 51CrV4, EN 10089	0.47–0.55	max 0.40	0.70–1.10	max 0.025	max 0.025	0.90–1.20	0.10–0.25

Balance iron. Indian mills make EN 47 to their own range, shown on the left. The main difference from 51CrV4 to EN 10089 is manganese (0.50–0.80% against 0.70–1.10%) and a slightly wider chromium range. If your drawing calls for the strict standard, mention it in your enquiry. The mill test certificate with each dispatch gives the actual result for that heat.

MECHANICAL PROPERTIES BY CONDITION

CONDITION	YIELD RP0.2, MPA	TENSILE RM, MPA	ELONG. A, %	RED. AREA Z, %	HARDNESS
Quenched & tempered (+QT)	1200 min	1350–1650	6 min	30 min	—
Soft annealed (+A)	—	—	—	—	248 HB max
Spheroidise annealed (+AC)	—	—	—	—	230 HB max
As sheared (+S)	—	—	—	—	280 HB max

Reference treatment: oil quench from 850 °C, temper at 450 °C. Actual values depend on section size and heat treatment.

HEAT TREATMENT

TREATMENT	TEMPERATURE	COOLING / QUENCH
Hot forging	800–1100 °C	Still air
Normalising	840–880 °C	Still air
Soft annealing	730–750 °C, 2 h	20 °C/h to 650 °C, then air
Stress relieving	550–650 °C	Still air
Hardening	830–860 °C	Oil
Tempering	380–680 °C, 1 h	Air

TRANSFORMATION TEMPERATURES

Ac1	738 °C
Ac3	778 °C
Ms	273 °C

PHYSICAL PROPERTIES

Density	7,800 kg/m ³
Young's modulus	210 GPa
Thermal expansion 20–300 °C	12 µm/m·K
Thermal conductivity	40–45 W/m·K

TYPICAL APPLICATIONS

Leaf springs, coil springs, valve springs, torsion bars, stabiliser bars, clutch components, hand tools.

ORDERING

Minimum order	100 kg
Cutting	Available when the balance piece is also taken; cutting charged extra
Documents	Mill test certificate with every dispatch
Delivery	Ex-Darukhana, Mumbai; transport and loading extra at actuals

Read more: [EN47 / 51CrV4 guide: equivalents, sizes and uses in India](#) · [EN47 sizes and stock](#) · [Round bar weight calculator](#)

ASK FOR SIZES AND PRICE

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