

This page is mainly introduced the S99 Datasheet, including chemical information, mechanical properties, physical properties, mechanical properties, heat treatment, and Micro structure, etc. It also contains the use of S99, such as it is commonly used in bars, sheet, plates, steel coils, steel pipes, forged and other materials application.

Datasheet for Steel Grades Specialsteel S99

S99 Standard Number:		
ITEM	Standard Number	Descriptions
1	BS 5S 99 : 1994	2.5 % nickel-chromiummolybdenum (high carbon) steel billets, bars, forgings and parts (1230-1420 MPa: limiting ruling section 150 mm)

S99 Chemical composition(mass fraction)(wt.%)									
Chemical		Min.(%)				Max.(%)			
C		0.36				0.44			
Si		0.10				0.35			
Mn		0.45				0.70			
P						0.025			
S						0.015			
Cr		0.5				0.8			
Mo		0.45				0.65			
Ni		2.3				2.8			
Al		0.015				0.050			
Fe						Base			
C	Si	Mn	P	S	Cr	Ni	Mo	V	Ta
W	N	Cu	Co	Pb	B	Nb	Al	Ti	Other

Tkble 1. Technical requirements for 2.5 % Ni-Cr-Mo (high carbon) steel forging stock and forgings
 1 Material designation S99

2 Chemical composition % Element C Si Mn P S Cr Mo Ni Al Fe

min. 0.36 0.10 0.45 - - 0.5 0.45 2.3 0.015 Base

max. 0.44 0.35 0.7 0.025 0.015 0.8 0.65 2.8 0.050

3 Method of melting Air melted by an electric process

4 Form

Method of production

Limit dimensions

Forging stock

Wrought or cast

Forgings Forgings

De < 150

5 Acceptance standards Section one and five of BS S 100 Section one and six of BS S 100

6 Condition of supply and heat treatment

prior to delivery

Softened

650 °C < 0/AC" 2)

Softened

650 °C < 0/AC1' 2)

Hardened and tempered

820 °C < B < 850 °C/OQ1) 2)

500 °C < 9 < 600 °C/AC1) 2)

7 Condition of use and heat treatment

prior to use

As condition of supply Hardened and tempered

820 °C < B < 850 °C/OQ1' 2)

500 °C < B < 600 °C/AC,) 2)

As condition of supply

8 Test piece

Heat treatment

Sampling

Condition

of supply

Machined or forged test

sample (see line 29)

Condition

of supply

Machined or forged test

samples (see line 29)

As condition of supply

9 Dimensions concerned De mm - < 150 - < 150 < 150

11 Direction of sample - L - L L

12

Tensile

Temperature в °C Ambient temperature

13

Proof stress • $\beta_{p0.2}$ MPa - > 1080 - - > 1080

14

Tensile Strength MPa - 1230 < Rm < 1420 - 1230 < Rm < 1420 1230 < Rm < 1420

15

Elongation A % - > 10 - > 10 > 10

16

Reduction of

area

Z %

-

17 Hardness HR

HV

< 277 363 £ HB < 415

380 < HV < 435

< 277 363 < HB < 415

380 < HV < 435

363 < HB < 415

380 < HV < 435

20 Impact Izod ft-lbf - a 25 1 a 25 > 25

29 Reference heat treatment Hardened and tempered

820 °C < B < 850 °C/OQ1) 2)

500 °C < B < 600 °C/AC1* 2)

97 Designation S99A S99C S99F

98 Notes ' ' The tolerance on the chosen temperature shall be ± 10 °C

2) AC = air cool; OQ = oil quench

S99 Physical Properties		
Tensile strength	115-234	σ _b /MPa
Yield Strength	23	σ _{0.2} ≥/MPa
Elongation	65	δ ₅ ≥ (%)
ψ	-	ψ ≥ (%)
Akv	-	Akv ≥/J
HBS	123-321	-
HRC	30	-

S99 Mechanical Properties		

Tensile strength	231-231	σ_b /MPa
Yield Strength	154	$\sigma_{0.2} \geq$ /MPa
Elongation	56	$\delta_5 \geq$ (%)
ψ	-	$\psi \geq$ (%)
Akv	-	Akv \geq /J
HBS	235-268	-
HRC	30	-

S99 Heat Treatment Regime

Annealing	Quenching	Tempering	Normalizing	Q & T
√	√	√	√	√

S99 Range of products

Product type	Products	Dimension	Processes	Deliver Status
Plates / Sheets	Plates / Sheets	0.08-200mm(T)*W*L	Forging, hot rolling and cold rolling	Annealed, Solution and Aging, Q+T, ACID-WASHED, Shot Blasting
Steel Bar	Round Bar, Flat Bar, Square Bar	Φ 8-1200mm*L	Forging, hot rolling and cold rolling, Cast	Black, Rough Turning, Shot Blasting,
Coil / Strip	Steel Coil /Steel Strip	0.03-16.0x1200mm	Cold-Rolled & Hot-Rolled	Annealed, Solution and Aging, Q+T, ACID-WASHED, Shot Blasting
Pipes / Tubes	Seamless Pipes/Tubes, Welded Pipes/Tubes	OD:6-219mm x WT:0.5-20.0mm	Hot extrusion, Cold Drawn, Welded	Annealed, Solution and Aging, Q+T, ACID-WASHED

We can produce Specialsteel the specifications follows: