

**This page is mainly introduced the S 99 Datasheet, including chemical information, mechanical properties, physical properties, mechanical properties, heat treatment, and Micro structure, etc. It also contains the use of S 99, such as it is commonly used in bars, sheet, plates, steel coils, steel pipes, forged and other materials application.**

## Datasheet for Steel Grades Specialsteel S 99

S 99 Standard Number:		
ITEM	Standard Number	Descriptions
1	BS 5S 99 : 1994	Technical requirements for 2.5 % Ni-Cr-Mo (high carbon) steel black bar

S 99 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

Table 2. Technical requirements for 2.5 % Ni-Cr-Mo (high carbon) steel black bars

I 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

Black bars

Forged or rolled

5 Acceptance standards Sections one and two of BS S 100 Sections one and three of BS S 100

6 Condition of supply and heat treatment

prior to delivery

Softened

650 °C < 0/AC1' 2)

Hardened and tempered

820 °C < B < 850 °C/OQ1' 2)

500 °C < B < 600 °C/AC'' 2) 3)

7 Condition of use and heat treatment

prior to use

Hardened and tempered

820 °C < B < 850 °C/OQ" 2)

500 °C < B < 600 °C/AC1' 2)

As condition of supply

8 Test piece

Heat treatment

Sampling

Condition of

supply

Machined or forged test

sample (see line 29)

As condition of supply

9 Dimensions concerned A, mm - < 150 < 150

11 Direction of sample - L L

12

Tensile

Temperature B °C Ambient temperature

13

Proof stress MPa - > 1080 > 1080

14

Strength Rm MPa -  $1230 < Rm < 1420$   $1230 < \sigma_T < 1420$ 

15

Elongation A % -  $> 10 > 10$ 

16

Reduction of

area

Z % -

17 Hardness HB

HV

 $< 277$   $363 < HB < 415$  $380 < HV < 435$  $363 < HB < 415$  $380 < HV < 435$ 20 Impact Izod ft-lbf -  $> 25 > 25$ 

29 Reference heat treatment Hardened and tempered

 $820\text{ }^\circ\text{C} < B < 850\text{ }^\circ\text{C/OQ}'' 2)$  $500\text{ }^\circ\text{C} < B < 600\text{ }^\circ\text{C/AC1}' 2)$ 

97 Designation S99B S99E

98 Notes 11 The tolerance on the chosen temperature shall be  $\pm 10$  °C.

2) AC = Air cool; OQ = oil quench

3) Where bars delivered in the finally heat treated condition have been subjected

to a cold straightening or cold rolling operation, they shall be given a stress

relieving treatment, which shall be sufficient to restore the proof stress

S 99 Physical Properties		
Tensile strength	115-234	$\sigma_b$ /MPa
Yield Strength	23	$\sigma_{0.2} \geq$ /MPa
Elongation	65	$\delta 5 \geq$ (%)
$\psi$	-	$\psi \geq$ (%)
Akv	-	Akv $\geq$ /J
HBS	123-321	-
HRC	30	-

S 99 Mechanical Properties		
Tensile strength	231-231	$\sigma_b$ /MPa
Yield Strength	154	$\sigma_{0.2} \geq$ /MPa
Elongation	56	$\delta 5 \geq$ (%)
$\psi$	-	$\psi \geq$ (%)
Akv	-	Akv $\geq$ /J
HBS	235-268	-
HRC	30	-

S 99 Heat Treatment Regime				
Annealing	Quenching	Tempering	Normalizing	Q & T
√	√	√	√	√

S 99 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	Φ8-1200mm*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:**