SPRING STEELS

SUNFLAG STEEL

BIS Approved
NABL Accreditated Chem & Mech Labs.
ISO 9001 & IATF16949 Certified by UL DQS
ISO 14001 & OHSAS 18001 Certified by TUV Nord
AD 2000 Merkblatt WO /PED Certified by TUV Nord

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General Features

Spring Steel is used for manufacturing various types of springs and components, for the suspension mechanism in Automobiles and Railways, like :

- Leaf Springs
- Coil Springs
- Stabiliser Bars
- Torsion Bars

A very high degree of quality, reliability and service life is expected in springs which are vital for any automobile or the railways. The spring's capacity to take on static and dynamic load over an extended period of time, depends on the steel that goes into its making.

Sizes and conditions of supply

Condition of supply	Shapes	Sizes
1. Hot Rolled	Flat	50 x 5 mm - 120 x 28 mm
	Round	12 mm - 100 mm dia
2. Drawn	Round	10 mm - 50 mm dia
3. Peeled and Ground	Round	10 mm - 50 mm dia

Edge Radius

Flats can be supplied with an edge radius "R" which is equal to either "T" or "T/2", where "T" is equal to thickness.

General Length

We cater to orders in standard and specific length.
a) Standard length 4 to 6 mtrs with 10% shorts down to 1 mtr.
b) Customer's specific lengths with tolerance +50/-0mm.

Straightness

Bars will have a straightness of 3 mm/mtr (max)

Quality

Surface Condition : On visual inspection, surface is free from harmful defects, eg. crack, lap, fold, scratch, roll/pass marks, pits etc.

Decarburization

	Full	Partial	Total
Flats (upto 80 x 13)	Nil	0.15	0.15 mm (max)
Flats (above 80 x 13)	0.03	0.25	0.28 mm (max)
Hot Rolled Round		0.8% of the size (max)	

Grain size

5-8 (As per ASTM E-112)

As Rolled Hardness

310 BHN (max)

Inclusion Rating

As per IS-4163/ASTM E-45 : THIN : 2.5 A,B,C,D max
: HEAVY : 1.5 A,B,C,D max

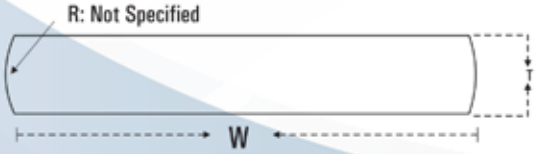
As per JIS G-0555
% dA - 0.15 max
% dB + dC - 0.10 max
% d Tot - 0.20 max

Delivery Conditions

- All bundles tied with wire/strapping at 3/4 places.
- Approx. bundle weight : 2MT. max
- Grade/HT. No. identification : By painted colour code and Heat Number written on each bundle /bar

Standard shapes and sizes of Spring Steel Flat Bars

1. RE Type



The conventional type is of Round Edge (RE) type, having edge radius approximately equivalent to thickness but not specified.

2. FL Type

Feather leaf type Spring Steel flats have edge radius of half of thickness and also have many advantages over RE type in terms of economical and technical aspects. Size - wise edge radius is to be mutually agreed.

Dimensional Tolerances

Flats :

Width Range (mm)	Tolerance (mm) (+/-)			Tolerance (mm)	
	Width (W)	Thickness (T)		Concavity (+max) for	
		< = 10	> 10	T < = 10	T > 10
40-50	0.30	0.15	-	0.15	0.15
51-75	0.50	0.15	0.20	0.15	0.20
76-100	0.70	0.20	0.25	0.20	0.20
101-125	0.90	0.25	0.40	0.30	0.40

Rounds (Hot Rolled) :

Size (mm Dia)		Tolerance (mm)	
Over	Upto & Including	Tolerance (Dia)	Tolerance (Out of Round)
-	12	± 0.18	0.25
12	15	± 0.18	0.25
15	22	± 0.20	0.30
22	25	± 0.24	0.35
25	28	± 0.25	0.40
28	31	± 0.28	0.45
31	34	± 0.30	0.50
34	38	± 0.36	0.60
38	50	± 0.40	0.60
50	64	+ 0.8/-0	0.80
64	80	+ 1.20/-0	0.80
80	89	+ 1.20/-0	0.80
89	100	+ 1.60/-0	1.20

Rounds (Bright Bars) :

Size (mm Dia)		Tolerance on Dia (mm)		
Over	Upto & Including	Cold Drawn	Peeled / Turned	Centreless Ground
-	10	+ 0/- 0.09	---	+ 0/- 0.036
10	18	+ 0/- 0.11	+ 0/- 0.11	+ 0/- 0.043
18	30	+ 0/- 0.13	+ 0/- 0.13	+ 0/- 0.052
30	50	+ 0/- 0.16	+ 0/- 0.16	+ 0/- 0.062

Fatigue Guaranteed Spring Steels

Sunflag Steel, a pioneer in making Spring Steel, has come up with products in this category, which ensure the required fatigue life to springs used in vehicles, in the most demanding situations.

The salient features of these products are :

a) Use of virgin inputs in steel making such as DRI, Pig Iron which are free from undesirable tramp elements.
b) Carefully planned, steel making refining vacuum degassing and casting processes.
c) Well controlled reheating and rolling process.
d) Closely monitored cooling parameters of rolled products.
e) Thorough inspection and testing.
f) Proper packing, stacking and storage for despatch.
g) Wide size range.

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Chemical Composition Of Typical Spring Steel of Various International Standards

Grade	CHEMISTRY												
	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	V	Al	B	Nb
DIN													
50CrV4	0.47-0.55	0.70-1.10	0.035 Max	0.035 Max	0.15-0.40	0.25 Max	0.90-1.20	-	-	0.10-0.20	0.040 Max	-	-
51CrMoV4	0.48-0.56	0.70-1.10	0.030 Max	0.030 Max	0.15-0.40	0.25 Max	0.90-1.20	-	0.15-0.25	0.07-0.12	0.040 Max	-	-
51CrV4	0.48-0.55	0.85-1.10	0.020 Max	0.020 Max	0.25-0.40	0.25 Max	0.95-1.20	0.20 Max	0.06 Max	0.10-0.20	0.015-0.040	-	-
51CrV4-Nb	0.50-0.55	0.90-1.10	0.015 Max	0.015 Max	0.15-0.40	0.25 Max	0.95-1.20	0.40 Max	0.06 Max	0.07-0.14	0.015-0.025	-	0.0600
5 Cr4Mo2V	0.48-0.56	0.70-1.10	0.025 Max	0.025 Max	0.15-0.40	-	0.90-1.20	-	0.15-0.25	0.07-0.12	-	-	-
52CrMoV4	0.48-0.56	0.70-1.10	0.015 Max	0.015 Max	0.15-0.40	-	0.90-1.20	-	0.15-0.25	0.07-0.12	-	-	-
55Cr3	0.50-0.60	0.60-0.80	0.035 Max	0.035 Max	0.10-0.35	0.25 Max	0.60-0.80	-	-	-	0.040 Max	-	-
55Si7	0.50-0.60	0.80-1.00	0.025 Max	0.025 Max	1.50-2.00	0.25 Max	0.25 Max	-	-	-	-	-	-
60Si7	0.55-0.65	0.80-1.00	0.025 Max	0.025 Max	1.50-2.00	0.25 Max	0.25 Max	-	-	-	-	-	-
60SiCr7	0.55-0.65	0.70-1.00	0.045 Max	0.045 Max	1.50-1.80	0.25 Max	0.20-0.40	-	-	-	0.40 Max	-	-
65Si7	0.60-0.70	0.80-1.00	0.025 Max	0.025 Max	1.50-2.00	-	0.25 Max	-	-	-	-	-	-
54SiCr6	0.50-0.59	0.50-0.80	0.03 Max	0.030 Max	1.20-1.60		0.50-0.80	-	-				0.1000
BS													
EN45A	0.55-0.65	0.70-1.00	0.050 Max	0.050 Max	1.70-2.00		0.25 Max	-	-			-	–
ASTM						0.25 Max				-	0.040 Max	-	-
SAE5160	0.56-0.64	0.75-1.00	0.035 Max	0.040 Max	0.15-0.30		0.70-0.90	-	-	-		-	-
SAE5160H	0.55-0.65	0.65-1.10	0.035 Max	0.035 Max	0.15-0.30	0.25 Max	0.60-1.00	-	-	-	0.040 Max	-	-
SAE51B60H	0.55-0.65	0.65-1.10	0.035 Max	0.040 Max	0.15-0.30	0.25 Max	0.60-1.00	-	-	-	0.040 Max	0.0005 Min	-
SAE9254	0.51-0.59	0.60-0.80	0.035 Max	0.040 Max	1.20-1.60	0.25 Max	0.60-0.80	-	-	-	0.040 Max	-	-
SAE9261B(M)	0.55-0.65	0.70-1.00	0.050 Max	0.050 Max	1.80-2.20	0.25 Max	0.10-0.25	0.35 Max	0.10 Max	-	0.040 Max	-	-
JIS						0.35 Max			-	0.10 Max	-		
SUP6	0.56-0.64	0.70-1.00	0.035 Max	0.035 Max	1.50-1.80	0.25 Max	0.25 Max	-	-	-	0.040 Max	-	-
SUP7	0.55-0.65	0.70-1.10	0.035 Max	0.035 Max	1.80-2.20	0.25 Max	0.25 Max	-	-	-	0.040 Max	-	-
SUP7C	0.58-0.64	0.80-1.00	0.030 Max	0.030 Max	1.90-2.20	0.25 Max	0.10-0.20	-	-	-	0.040 Max	-	-
SUP7N	0.58-0.63	0.80-1.00	0.035 Max	0.035 Max	1.90-2.20	-	0.10-0.20	-	-	-	-	-	-
SUP9	0.52-0.60	0.65-0.95	0.035Max	0.035Max	0.15-0.35	0.15 Max	0.65-0.95	-	-	-	-	-	–
SUP9A	0.56-0.64	0.65-0.95	0.035 Max	0.035 Max	0.15-0.35	0.25 Max	0.70-1.00	-	-	-	0.040 Max	-	-
SUP9H	0.52-0.60	0.65-0.95	0.035 Max	0.035 Max	0.15-0.35	0.25 Max	0.65-0.95	-	-	-	0.040 Max	-	-
SUP9M	0.55-0.60	0.75-0.90	0.030 Max	0.030 Max	0.15-0.35	0.30 Max	0.75-0.90	-	-	-	0.020 Min	-	-
SUP9N	0.56-0.60	0.80-1.00	0.030 Max	0.030 Max	0.15-0.35	0.25 Max	0.80-1.00	–	-	-	0.040 Max	-	-
SUP11A	0.56-0.64	0.70-1.00	0.035 Max	0.035 Max	0.15-0.35		0.70-1.00	-	-	-		0.0005 Min	-
SUP12	0.51-0.59	0.60-0.90	0.030 Max	0.030 Max	1.20-1.60	0.25 Max	0.60-0.90	-	-	-	0.040 Min	-	-