

# SPRING STEELS



Clean Steel  
State of the Art Process Technology

## SIZES AND CONDITIONS OF SUPPLY

Condition of Supply	Shapes	Sizes
Hot Rolled	Flat (WxT)	50x5 mm – 125x34 mm
Hot Rolled	Round	5.5 to 250 mm
Drawn	Round	5 – 50 mm
Peeled and Ground	Round	5 – 100 mm



### 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 hot rolled 3 mm/mtr (max) & hot rolled & machine straightened 1 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	0.25 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/ASTME-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 : 2 MT. max

Grade/HT. No. identification : By painted colour code and Heat Number written on each bundle / bar

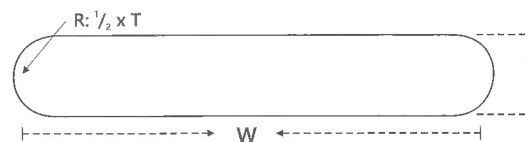
### Standard shapes and sizes of Spring Steel Flat Bars

#### 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 be mutually agreed.

## DIMENSIONAL TOLERANCES

Flats :

Width Range (mm)	Width (W)	Tolerance (mm) (+/-)		Tolerance (mm)	
		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 :

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



## CHEMICAL COMPOSITION OF TYPICAL SPRING STEEL OF VARIOUS INTERNATIONAL STANDARDS

Grade	C H E M I S T R Y												
	C	Mn	P	S	Si	Cu	Cr	Ni	Mo	V	Al	B	Nb
<b>DIN</b>													
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
<b>BS</b>													
EN45A	0.55-0.65	0.70-1.00	0.050 Max	0.050 Max	1.70-2.00	-	0.25 Max	-	-	-	-	-	-
<b>ASTM</b>													
SAE5160	0.56-0.64	0.75-1.00	0.035 Max	0.040 Max	0.15-0.30	0.25 Max	0.70-0.90	-	-	-	0.040 Max	-	-
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	-	-
<b>JIS</b>													
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	-	-



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