

I. Product Order Size Acceptable Range :

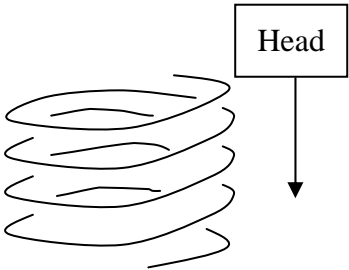
A. Wire Rods (in Coil) Standard Diameter :

Ø5.5mm、Ø6.5mm、Ø7.0mm、Ø8.0mm、Ø9.0mm、Ø10.0mm、Ø11.0mm、Ø12.0mm、 Ø13.0mm、
Ø14.0mm、Ø15.0mm、Ø16.0mm。

B. Deformed Bars (in Coil) Standard Diameter :

D10 (3/8") & D13 (4/8")。

II. Dimension of Wire Rod & Deformed Bar in Coil :

Item \ Product	Wire Rod	Deformed Bar	Rotating Direction
Weight	Approximate 1.5 Ton ~ 2.0 Ton (Depend on raw material weight)		
Inside Diameter	88 ~ 106 cm	80 ~ 106 cm	
Outside Diameter	130 ~ 146 cm	130 ~ 150 cm	
Length After Packing	120 ~ 145 cm	130 ~ 160 cm	
Rotating Direction	Clockwise	Clockwise	

III. Available Grades and Specifications :

STEEL GRADES :

1. Low Carbon Steel (Rimmed Steel)
2. Carbon Steel Wire Rods for Cold Heading (Aluminum Killed Steel / Silicon Killed Steel)
3. High Carbon Steel
4. Low Alloy Carbon Steel and Boron Steel
5. Low Carbon Steel (Silicon Killed Steel)
6. Free Cutting Steel
7. Carbon Steels for Machine Structure Use
8. Deformed Bars for Concrete Reinforcement

PRODUCT SPECIFICATION :

1. Low Carbon Steel (Rimmed Steel)

Item	Symbol of Grade	Chemical Composition (wt%)				Quality Code	Standard Applicable
		C	Mn	P	S		
1	1006R	0.08 max	0.25~0.40	0.030 max	0.050 max	L0	SAE J 403
2	SWRM6	0.08 max	0.60 max	0.040 max	0.040 max	L0	JIS G 3505
3	1008R	0.10 max	0.30~0.50	0.030 max	0.050 max	L0	SAE J 403
4	SWRM8	0.10 max	0.60 max	0.040 max	0.040 max	L0	JIS G 3505
5	1010R	0.08~0.13	0.30~0.60	0.030 max	0.050 max	L0	SAE J 403
6	SWRM10	0.08~0.13	0.30~0.60	0.040 max	0.040 max	L0	JIS G 3505

Size Tolerances :

『L0』：Diameter Tolerances : ± 0.40 mm, Out-of-Round : 0.60 mm max.

Applications :

『L0』：Drawing

2. Carbon Steel Wire Rods for Cold Heading (Aluminum Killed Steel / Silicon Killed Steel)

Item	Symbol of Grade	Chemical Composition (wt%)						Quality Code	Standard Applicable
		C	Si	Mn	P	S	Al		
1	SWRCH6A	0.08 max	0.10 max	0.60 max	0.030 max	0.035 max	0.02 min	C1/L1	JIS G 3507
2	SWRCH8A	0.10 max	0.10 max	0.60 max	0.030 max	0.035 max	0.02 min	C1/L1	JIS G 3507
3	SWRCH10A	0.08~0.13	0.10 max	0.30~0.60	0.030 max	0.035 max	0.02 min	C1/L1	JIS G 3507
4	SWRCH18A	0.15~0.20	0.10 max	0.60-0.90	0.030 max	0.035 max	0.02 min	C1	JIS G 3507
5	SWRCH22A	0.18~0.23	0.10 max	0.70~1.00	0.030 max	0.035 max	0.02 min	C1	JIS G 3507
6	SWRCH22K	0.18~0.23	0.10~0.35	0.70~1.00	0.030 max	0.035 max	-	C1	JIS G 3507

Size Tolerances:

 『C1』 : Diameter Tolerances : ± 0.30 mm, Out-of-Round : 0.40 mm max.

 『L1』 : Diameter Tolerances : ± 0.40 mm, Out-of-Round : 0.60 mm max.

Applications :

『C1』 : Drawing, Cold Heading, Cold Forging

『L1』 : Drawing

Note : Above items are applicable to JIS standard only, but similar to SAE standard.

3.High Carbon Steel

Item	Symbol of Grade	Chemical Composition (wt%)					Quality Code	Standard Applicable
		C	Si	Mn	P	S		
1	SWRH52A	0.49~0.56	0.15~0.35	0.30~0.60	0.030 max	0.030 max	H1	JIS G 3506
2	SWRH62A	0.59~0.66	0.15~0.35	0.30~0.60	0.030 max	0.030 max	H1	JIS G 3506
3	SWRH62B	0.59~0.66	0.15~0.35	0.60~0.90	0.030 max	0.030 max	H1	JIS G 3506
4	SWRH67A	0.64~0.71	0.15~0.35	0.30~0.60	0.030 max	0.030 max	H1	JIS G 3506
5	SWRH67B	0.64~0.71	0.15~0.35	0.60~0.90	0.030 max	0.030 max	H1	JIS G 3506
6	SWRH72B	0.69~0.76	0.15~0.35	0.60~0.90	0.030 max	0.030 max	H1	JIS G 3506

Size Tolerances :

『H1 』：Diameter Tolerances : ± 0.40 mm 、Out-of-Round : 0.50 mm max.

Applications :

『H1 』：Piano Wire, Spring, PC Wire

Note : Above items are applicable to JIS standard only, but similar to SAE standard.

4. Low Alloy Carbon Steel and Boron Steel

Item	Symbol of Grade	Chemical Composition (wt%)								Quality Code	Standard Applicable
		C	Si	Mn	P	S	Cr	Al	B		
1	35ACR	0.35~0.39	0.10 max	0.60~0.90	0.030 max	0.030 max	0.20~0.40	0.01 min	-	C1	QS
2	40ACR	0.40~0.44	0.10 max	0.60~0.90	0.030 max	0.030 max	0.20~0.40	0.01 min	-	C1	QS
3	10B21	0.18~0.23	0.10 max	0.70~1.00	0.030 max	0.035 max	--	-	0.0005~0.003	C1	QS
4.	10B33	0.32~0.36	0.15~0.35	0.70~1.00	0.030 max	0.035 max	--	--	0.0005~0.003	C1	QS

Size Tolerances :

『C1』 : Diameter Tolerances : ± 0.30 mm 、 Out-of-Round : 0.40 mm max.

Applications :

『C1』 : Cold Heading, Cold Forging

Note : Item 1 & 2 are fully applicable to CSC (CHINA STEEL) standard only.

5. Low Carbon Steel (Silicon Killed Steel)

Item	Symbol of Grade	Chemical Composition (wt%)					Quality Code	Standard Applicable
		C	Si	Mn	P	S		
1	SWRM 6K	0.08 max	--	0.60 max	0.040 max	0.040 max	L0	JIS G 3505
2	SWRM 8K	0.10 max	--	0.60 max	0.040 max	0.040 max	L0	JIS G 3505
3	SWRM 10K	0.08~0.13	--	0.30~0.60	0.040 max	0.040 max	L0 / F1	JIS G 3505
4	SWRM 12K	0.10~0.15	--	0.30~0.60	0.040 max	0.040 max	L0	JIS G 3505
5	SWRM 15K	0.13~0.18	--	0.30~0.60	0.040 max	0.040 max	L0 / F1	JIS G 3505

Size Tolerances :

 『L0』：Diameter Tolerances : ± 0.40 mm 、 Out-of-Round : 0.60 mm max.

 『F1』：Diameter Tolerances : ± 0.40 mm 、 Out-of-Round : 0.56 mm max.

Applications :

『L0』：Drawing, Mesh

『F1』：Polished Bar

Note : When silicon is required, the range is 0. 35% max.

6. Free Cutting Steel

Item	Symbol of Grade	Chemical Composition (wt%)					Quality Code	Standard Applicable
		C	Mn	P	S	Pb		
1	12L14	0.15 max	0.85~1.15	0.04~0.09	0.26~0.35	0.15~0.35	F1	SAE J 403
2	SUM24L	0.15 max	0.85~1.15	0.04~0.09	0.26~0.35	0.10~0.35	F1	JIS G 4804
3	1215MS	0.09 max	1.10~1.40	0.04~0.09	0.33~0.42	--	F1	QS

Size Tolerances :

『F1』：Diameter Tolerances : ± 0.40 mm 、 Out-of-Round : 0.56 mm max.

Applications :

『F1』：Polished Bar

7. Carbon Steels For Machine Structure Use

Item	Symbol of Grade	Chemical Composition (%)					Quality Code	Standard Applicable
		C	Si	Mn	P	S		
1	1045	0.43~0.50	--	0.60~0.90	0.030 max	0.050 max	F1	SAE J 403
2	S45C	0.42~0.48	0.15~0.35	0.60~0.90	0.030 max	0.035 max	F1	JIS G 4051
3	SS400	--	--	--	0.050 max	0.050 max	F1 / L0	JIS G 3101

Size Tolerances :

『F1』 : Diameter Tolerances : ± 0.40 mm 、 Out-of-Round : 0.56 mm max.

『L0』 : Diameter Tolerances : ± 0.40 mm 、 Out-of-Round : 0.60 mm max.

Applications :

『F1』 : Polished Bar 、 Machine Parts

『L0』 : Drawing, Mesh

Note : When silicon is required, the range is 0. 35% max.

8. Deformed Bars for Concrete Reinforcement

Item	Symbol of Grade	Chemical Composition (%)						Quality Code	Standard Applicable
		C	Mn	P	S	Si	C.E. *1		
1	SD280	--	--	0.060 max	0.060 max	--	--	H0	CNS 560
2	SD280W	0.30 max	1.50 max	0.040 max	0.040 max	0.50 max	0.55 max	H0	CNS 560
3	SD420	0.32 max	1.80 max	0.050 max	0.050 max	0.50 max	0.57 max	H0	CNS 560
4	SD420W	0.30 max	1.50 max	0.040 max	0.040 max	0.50 max	0.55 max	H0	CNS 560
5	GR40	--	--	0.060max	--	--	--	H0	ASTM A615
6	GR60	--	--	0.060max	--	--	--	H0	ASTM A615
7	GR60	0.30max	1.50max	0.035max	0.045max	0.50max	0.55max	H0	ASTM A706
8	SD295A	--	--	0.050 max	0.050 max	--	--	H0	JIS G 3112
9	SD390	0.29 max	1.80 max	0.040 max	0.040 max	0.55 max	0.55 max	H0	JIS G 3112

1. Carbon Equivalent Formula:

$$\text{CNS Standards \& ASTM Standards : } C.E.(%) = \left(C + \frac{Mn}{6} + \frac{Cu}{40} + \frac{Ni}{20} + \frac{Cr}{10} - \frac{Mo}{50} - \frac{V}{10} \right) \%$$

$$\text{JIS Standards : } C.E.(%) = \left(C + \frac{Mn}{6} \right) \%$$

2. Item 8 & Item 9 had NEW JIS Mark certification.

Mechanical Properties of Deformed Bars for Concrete Reinforcement

<i>CNS Standard (CNS 560:94)</i>							
Symbol of Grade	Designation No.	Yield strength N/mm ²	Tensile strength N/mm ²	$\frac{T.S.}{Y.S.}$	Elongation (%)	Bendability	
						Bend Degree	Inside Radius
SD280	D10、D13	280 min	420 min	-	14 min	180°	4D
SD280W	D10、D13	280~380	420 min	1.25 min	14 min	180°	4D
SD420	D10、D13	420~540	620 min	-	12 min	180°	5D
SD420W	D10、D13	420~540	550 min	1.25 min	12 min	180°	3D

<i>ASTM Standard (ASTM A615/615M-12 & A706/A706M-09b)</i>							
Symbol of Grade	Designation No.	Yield strength psi [Mpa]	Tensile strength psi [Mpa]	$\frac{T.S.}{Y.S.}$	Elongation (%)	Bendability	
						Bend Degree	Inside Radius
A615 Grade 40	3、4	40,000 min [280 min]	60,000 min [420 min]	-	11 min (No.3) 12 min (No.4)	180°	3.5 d
A615 Grade 60	3、4	60,000 min [420 min]	90,000 min [620 min]	-	9 min	180°	3.5 d
A706 Grade 60	3、4	60,000~78,000 [420~540]	80,000 min [550 min]	1.25 min	14 min	180°	3 d

<i>JIS Standard (JIS G 3112:2010)</i>							
Symbol of Grade	Designation No.	Yield strength N/mm ²	Tensile strength N/mm ²	$\frac{T.S.}{Y.S.}$	Elongation (%)	Bendability	
						Bend Degree	Inside Radius
SD295A	D10、D13	295 min	440~600	-	16 min	180°	1.5D
SD390	D10、D13	390~510	560 min	-	16 min	180°	2.5D

Note : Above items are applicable to CNS,JIS and ASTM standards ◦