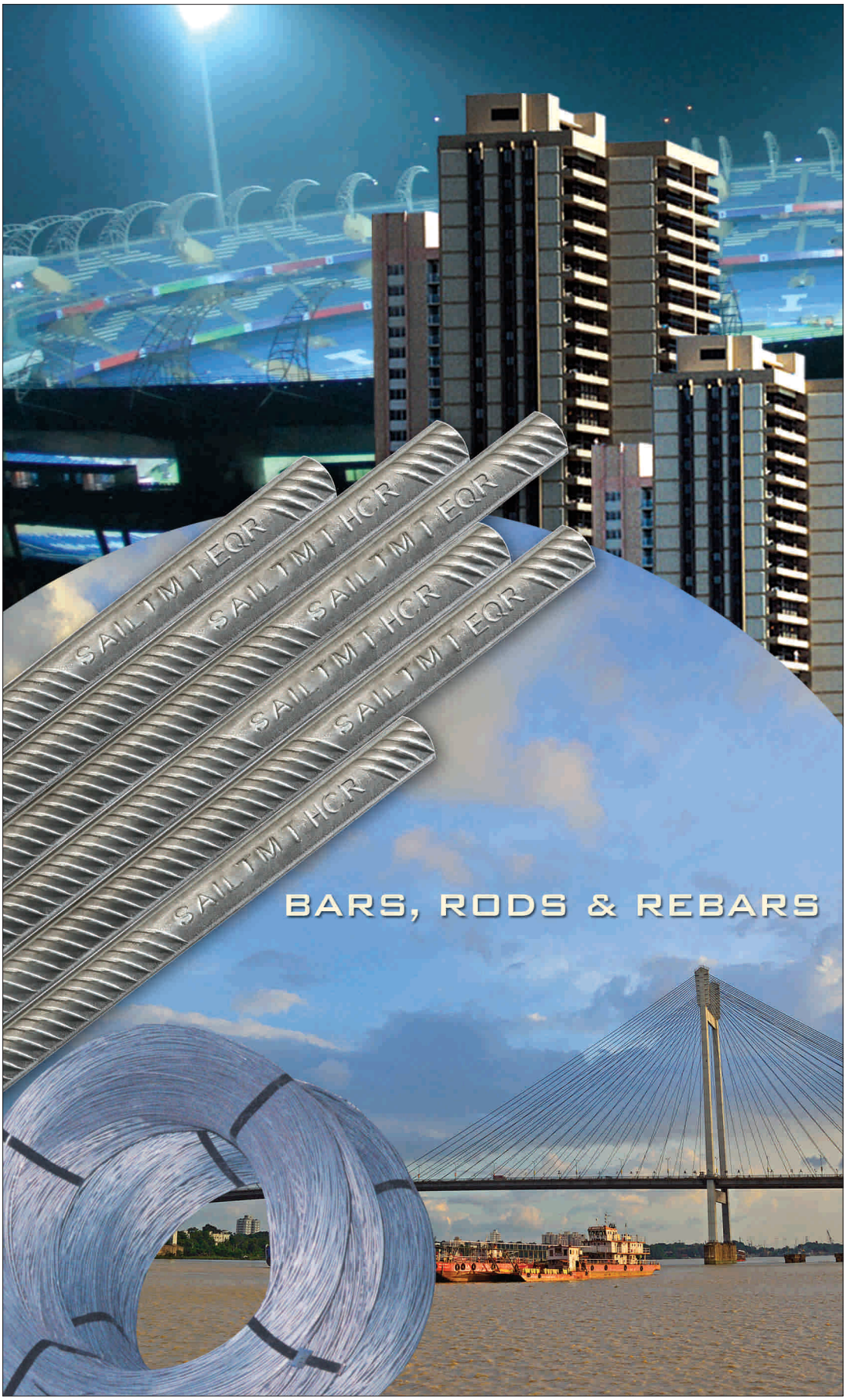
SAIL TM T EQR
SAIL TM T HCR
SAIL TM T EQR
SAIL TM T HCR
SAIL TM T EQR
SAIL TM T HCR
BARS, RODS & REBARS

Rebars

Rationalised sizes (SAIL TMT rebars)

Nominal Diameter (mm) (mm)	Weight (kg/m)	Length (m)	Mill
6	0.222	Coil form	IWRM
8	0.395	Coil form/ Straight*	BWRM/IWRM/ IBRM
10	0.617		
12	0.89		
16	1.58	5.5 to 13.5	DMM/IBRM
20	2.47		DMM/ IBRM
25	3.85		DMM/IBRM/BMM
28	4.83		BMM/ IBRM
32	6.31		BMM/ IBRM
36	7.99		BMM/ IBRM
40	9.85		BMM/ IBRM
45	12.5		BMM/ IBRM

* may be supplied in straight length from IBRM

*Bright Bar Quality

Abbreviations used : BWRM - Bhilai Wire Rod Mill, IWRM - IISCO Wire Rod Mill, BMM - Bhilai Merchant Mill, DMM - Durgapur Merchant Mill, IBRM - IISCO Bar & Rod Mill (New)

Tolerances on Length and Nominal Mass as per IS:1786-2008

Specified Lengths : If bars are specified to be cut to certain lengths, each bar shall be cut within the deviations of +75mm, -25mm on the specified length, but if minimum lengths are specified the deviations shall be +50mm, 0mm

Packaging: Signode Strapping in bundles of 5 tonnes

Common grades: IS:2062, 2011 for bars and rods; IS: 1786, 2008 for rebars. Also available in ASTM-A615 Grade 40 (for TMT Wire Rods) and ASTM-A 615 Grade 40/Grade 60 (for TMT bars), if sufficient orders are there.

Chemical Composition SAIL TMT (IS : 1786, 2008)

Grade	% C max	% S max	% P max	S+P max	Carbon Equivalent max.
Fe 500	0.30	0.055	0.055	0.105	As per IS 1786
Fe 550	0.30	0.055	0.050	0.100	
Fe 600	0.30	0.040	0.040	0.075	
Fe 500 D	0.25	0.040	0.040	0.075	
Fe 550 D	0.25	0.040	0.040	0.075	
Fe 500 HCR*	0.25	0.040	0.040	0.105	
Fe 550 HCR*	0.25	0.040	0.040	0.100	
Fe 600 HCR*	0.30	0.040	0.040	0.075	
Fe 415S EQR	0.25	0.045	0.045	0.085	
Fe 415S HCR EQR *	0.25	0.045	0.045	0.085	
Fe 500S EQR	0.25	0.040	0.040	0.075	
Fe 500S HCR EQR*	0.25	0.040	0.040	0.075	

* In case of Cu-P grade HCR TMT, total Cu+P is 0.40% min., P can be added upto 0.12% max. provided C<0.15%.
In case of Cu-Cr grade HCR TMT, Total Cu+Cr is 0.75% min.
When Micro Alloying Elements like Nb, V, Ti added, shall be 0.3% max. either singly or in combine.

Chemical Composition SAIL TMT Rock/Roofbolt

Grade	% C max	% S max	% P max	S+P max	Alloying/ Micro Alloying
Fe 500	0.25	0.040	0.040	0.075	0.3 % max.
Fe 600	0.30	0.040	0.040	0.075	
Fe 640	0.30	0.040	0.040	0.075	

Mechanical Properties of SAIL TMT (IS: 1786, 2008 amended 2012)

Grade	Yield Strength (MPa)		Ultimate Tensile Strength min. (MPa)	UTS/YS* min.	% Elongation min.	% Uniform Elongation# min
	min.	max.				
Fe 500	500	-	545	1.08	12	-
Fe 550	550	-	585	1.06	10	-
Fe 600	600	-	660	1.06	10	-
Fe 500 D	500	-	565	1.10	16	5
Fe 550D	550	-	600	1.08	14.5	5
Fe 500 HCR	500	-	565	1.10	16	5
Fe 550 HCR	550	-	600	1.08	14.5	5
Fe 600 HCR	600	-	660	1.06	10	-
Fe 415S EQR	415	540	1.25 times YS	1.25	20	10
Fe 415S HCR EQR	415	540	1.25 times YS	1.25	20	10
Fe 500S EQR	500	625	1.25 times YS	1.25	18	8
Fe 500S HCR EQR	500	625	1.25 times YS	1.25	18	8

Mechanical Properties of SAIL TMT Rock/Roofbolt

Grade	Yield Strength (MPa)	Ultimate Tensile Strength min. (MPa)	UTS/YS* min.	% Elongation min.
Fe 500	500	550	1.1	14
Fe 600	600	660	1.1	12
Fe 640	640	705	1.1	10

* UTS/ YS refers to ratio of Ultimate Tensile Strength to the 0.2% proof stress or Yield Strength of the test piece.
# With mutual consent

Applications

Grade	Application	Special Qualities
SAIL TMT D	Reinforced Concrete Construction (RCC) in buildings, bridges and other concrete structures.	Excellent bendability, good weldability and high fatigue resistance on dynamic loading.
SAIL TMT HCR	RCC Construction exposed to coastal, marine or underground environment	In addition to SAIL TMT D, it possesses high corrosion resistance properties
SAIL TMT EQR	RCC construction in earthquake prone zone	In addition to SAIL TMT D, it has high UTS/YS ratio, higher elongation, uniform elongation and narrow range of YS.
SAIL TMT HCR EQR	RCC construction in corrosion as well as earthquake prone zone.	Posses combined properties of SAIL TMT HCR & SAIL TMT EQR.
SAIL TMT Rock/ Roofbolt	Underground mine and tunnel roof support, Slope stabilisation in hills and Soil nailing/ anchoring	High strength, better toughness and excellent bond properties with grouting materials due to its modified rib design.

Wire Rods

Wire Rods from Bhilai Steel Plant

Size in mm	Weight kg/m	Mill
5.5	0.186	BWRM
6	0.222	BWRM
7	0.302	BWRM
8	0.395	BWRM
10	0.617	BWRM

Abbreviation used : BWRM - Bhilai Wire Rod Mill

Coil Weight : 850 kg per coil

Coil Dimension : Outer diameter -1240/1380 mm; Inner diameter 830/956 mm; Height 512/620 mm

Packaging : Each coil is strapped with metallic straps.

Common grades : IS 2062/2011, IS 2879/1998, SWR-14, SWR-10, SAE 1008*, SAE 1010* (*CHQ under development)

Materials are also available in the following foreign specifications :
JIS-G-3505-SWRM-10, JIS-G-3112-1991-SR-235, ASTM-A 510, M-93, SAE-1015, if sufficient orders are available.

Chemical Composition

Specification	Grade	C %	Mn %	S % max	P % max
IS: 2062/2011	Grade A	0.23 max	1.50 max	0.045	0.045
IS: 2879	Rimming	0.1 max	0.38-0.62	0.03	0.03
SWR-14		0.14 max	0.60 max	0.05	0.05
SWR-10		0.1 max	0.60 max	0.04	0.04
SAE 1008		0.1 max	0.30-0.50	0.05	0.04
SAE 1010		0.08-0.13	0.30-0.60	0.05	0.04
High Carbon	EN-8	0.35-0.45	0.60-1.0	0.030	0.035
	EN-9	0.50-0.60	0.50-0.80	0.030	0.035

Note : For EN-8 & EN-9, Si 0.1 to 0.35

Applications

Specification	Application
IS : 2062/2011	Structural applications
IS : 2879/1998	Arc welding electrodes, welding machine wires
SWR-14, SAE-1010	Bolts, nuts, rivets, machine screw, wire nail, fencing wire, wire netting, bright bar and other general engineering applications
SWR-10, SAE-1008	Cable armouring, wire mesh and other low carbon applications

Wire Rods from IISCO Steel Plant

Diameter (mm)	Weight (kg/m)	Mill
5.5	0.186	IWRM
6	0.222	IWRM
7	0.302	IWRM
8	0.394	IWRM
10	0.616	IWRM
12	0.887	IWRM
14	1.208	IWRM
16	1.578	IWRM
20	2.465	IWRM
22	2.983	IWRM

Abbreviations used : IWRM - IISCO Wire Rod Mill
Coil Weight : 2000kg max.
Coil Inner Diameter : 850/900mm
Coil Outer Diameter : 1250mm
Coil Height before/after compacting : 2000/1500mm
Packaging by strapping : Tying with metallic strap

Tolerance : As per IS: 16124, 2004

Product Attributes : Fine grain steel or as per customer requirement of killed steel variety
Depth of decarburisation = 1.5% of Wire Rod Diameter (maximum)
Gaseous Content: Nitrogen = 70 ppm (maximum). With our Vacuum Degassing facility, we can adhere to stricter specifications on mutual agreement

Applications

Specification	Application
Carbon steel SAE 1006 - SAE 1085; JIS G 3506;	Various grades of steel wires galvanized or plain and for making nails, mesh, rope wires, pre-stressed concrete wire, needle wires, general purpose wires, industrial wires, agriculture wires, brush wires, chain rivet wires, umbrella ribs, piano wire etc.
IS: 2879, SWRY 11-21, YSW 11-41, YGW 11-41	CO_2 gas shielded arc welding, submerged arc welding wire and general electrodes
Spring Steel JIS G 4801, SUP 9 - SUP13	Coil springs for shock absorber, clutch, valve and other dynamically stressed application in automobile industry.
Bearing Steel SAE 52100, EN31	For manufacture of bearing components like balls, rollers and needles. Also used in manufacturing of axle, spindle, gear etc.
Cold Heading Quality IS:11169 (Part 1), IS: 2255, SAE1010/ 1015/1018/1020, SAE10B21/ SAE15B25/ SAE15B41/19MnB4	For manufacturing of fasteners like bolts, nuts or screws by cold forging or extruding and are widely used in general and automobile industries.
Free Cutting Steel SUM11/12/22L,SAE 12L14, EN 1A/8M	For manufacturing intricate automobile parts and white good appliances.
IS: 2062, 2011	General applications in structures

Chemical Composition of ISP Wire Rods

Carbon Grade Steel

Grade SAE	Chemical Composition by weight %				
	C	Mn	P max	S max	Si
1006	0.08 max.	0.25-0.40	0.04	0.05	0.15 ~ 0.30
1008	0.10 max.	0.30-0.50	0.04	0.05	0.15 ~ 0.30
1010	0.08-0.13	0.30-0.60	0.04	0.05	0.15 ~ 0.30
1012	0.10-0.15	0.30-0.60	0.04	0.05	0.15 ~ 0.30
1015	0.13-0.18	0.30-0.60	0.04	0.05	0.15 ~ 0.30
1018	0.15-0.20	0.60-0.90	0.04	0.05	0.15 ~ 0.30
1020	0.18-0.23	0.30-0.60	0.04	0.05	0.15 ~ 0.30
1030	0.28-0.34	0.60-0.90	0.04	0.05	0.15 ~ 0.30
1035	0.32-0.38	0.60-0.90	0.04	0.05	0.15 ~ 0.30
1038	0.35-0.42	0.60-0.90	0.04	0.05	0.15 ~ 0.30
1040	0.37-0.44	0.60-0.90	0.04	0.05	0.15 ~ 0.30
1065	0.60-0.70	0.60-0.90	0.04	0.05	0.35 max
1075	0.70-0.80	0.40-0.70	0.04	0.05	0.35 max
1085	0.80-0.93	0.70-1.00	0.04	0.05	0.35 max
Grade JIS G 3506	Chemical Composition by weight %				
	C	Si	Mn	P	S
HSWR 52A	0.49-0.56	0.15-0.35	0.30-0.60	0.040 max.	0.040 max.
HSWR 62A	0.59-0.66	0.15-0.35	0.30-0.60	0.040 max.	0.040 max.
HSWR 82A	0.79-0.86	0.15-0.35	0.30-0.60	0.030 max.	0.030 max.

Electrode Quality steel

Grade IS 2879	Chemical Composition max. by weight %								
	C	Si	Mn	P	S	Cu	V	Ti	Al
EWR	0.10	0.03	0.38-0.62	0.03	0.03	0.15	0.005	0.003	0.012
EWNR	0.10	0.03	0.38-0.62	0.03	0.025	0.15	0.005	0.003	0.012

Note : Cr+Ni,+Mo= 0.15% max., No individual M A elements shall be more than 0.10%

Spring Steels

Grade JIS G 4801	Chemical Composition max. by weight %							
	C	Si	Mn	P	S	Cr	V	B
SUP 3	0.75-0.90	0.15-0.35	0.30-0.60	0.035	0.035	-	-	-
SUP 6	0.56-0.64	1.50-1.80	0.70-1.00	0.035	0.035	-	-	-
SUP 7	0.56-0.64	1.80-2.20	0.70-1.00	0.035	0.035	-	-	-
SUP 9	0.52-0.60	0.15-0.35	0.65-0.95	0.035	0.035	0.65-0.95	-	-
SUP 9A	0.56-0.64	0.15-0.35	0.70-1.00	0.035	0.035	0.70-1.00	-	-
SUP 10	0.47-0.55	0.15-0.35	0.65-0.95	0.035	0.035	0.80-1.10	0.15-0.25	-
SUP 11A	0.55-0.65	0.15-0.35	0.70-1.00	0.035	0.035	0.70-1.00	-	0.0005
SUP 12	0.51-0.59	1.20-1.60	0.60-0.90	0.035	0.035	0.60-0.90	-	-
SUP 13	0.56-0.64	0.15-0.35	0.70-1.00	0.035	0.035	0.70-0.90	-	-

Note : Throughout classes, the value of Cu as impurities shall not exceed 0.30%

Free Cutting Carbon Steels

Grade JIS G 4804	Chemical Composition by weight %				
	C	Mn	P	S	Pb
SUM 11	0.08-0.13	0.30-0.60	0.040 max.	0.08-0.13	-
SUM 12	0.08-0.13	0.60-0.90	0.040 max.	0.08-0.13	-
SUM 12L	0.08-0.13	0.60-0.90	0.040 max.	0.08-0.13	0.10-0.35
SUM 21	0.13 max.	0.70-0.10	0.07-0.12	0.16-0.23	-
SUM 22	0.13 max.	0.70-1.00	0.07-0.12	0.24-0.33	-
SUM 22L	0.13 max.	0.70-1.00	0.07-0.12	0.24-0.33	0.10-0.35

High Carbon Chromium Bearing Steels

Grade JIS G 4805	Chemical Composition by weight %						
	C	Si	Mn	P max.	S max.	Cr	Mo
SUJ 1	0.95-1.10	0.15-0.35	0.50 max.	0.025	0.025	0.90-1.20	-
SUJ 2	0.95-1.10	0.15-0.35	0.50 max.	0.025	0.025	1.30-1.60	-
SUJ 3	0.95-1.10	0.40-0.70	0.90-1.15	0.025	0.025	0.90-1.20	-
SUJ 4	0.95-1.10	0.15-0.35	0.50 max.	0.025	0.025	1.30-1.60	0.10-0.25
SUJ 5	0.95-1.10	0.40-0.70	0.90-1.15	0.025	0.025	0.90-1.20	0.10-0.25

Note : Other elements Ni, Cu shall not exceed 0.25%

Grade	C	Si	Mn	P	S	Cu	Cr	Al
SAE 52100	0.98-1.10	0.15-0.30	0.25-0.45	0.025 max	0.015 max	0.25 max	1.4-1.6	0.02-0.05

Note : Other elements Ni, Cu shall not exceed 0.25%

Alloy Steels

Grade	Chemical Composition max. by weight %							
SAE	C	Mn	P	S	Si	Ni	Cr	Mo
SAE 4135	0.33-0.38	0.70-0.90	0.035	0.04	0.15-0.30	-	0.80-1.10	0.15-0.25
SAE 4140	0.38-0.43	0.75-1.00	0.035	0.04	0.15-0.30	-	0.80-1.10	0.15-0.25
SAE 8620	0.18-0.23	0.70-0.90	0.035	0.04	0.15-0.30	0.40-0.60	0.04-0.70	0.15-0.25
SAE 9254	0.51-0.59	0.60-0.80	0.035	0.04	0.20-1.60	-	0.60-0.90	-

Grade	Chemical Composition by weight %						
JIS G 4105	C	Si	Mn	P max.	S max.	Cr	Mo
SCM 415	0.13-0.18	0.15-0.35	0.60-0.85	0.03	0.03	0.90-1.20	0.15-0.30
SCM 420	0.18-0.23	0.15-0.35	0.60-0.85	0.03	0.03	0.90-1.20	0.15-0.30

Note : As impurities, Ni and Cu shall not exceed 0.25% and 0.30% respectively for all grades.

Cold Heading Quality

SAE	Chemical Composition by weight %					
	C	Si	Mn	P	S	B
10B21	0.18-0.23	0.15-0.30	0.80-1.10	0.040 max.	0.040 max.	0.0005 - 0.0030
15B23	0.18-0.25	0.15-0.30	0.80-1.10	0.040 max.	0.040 max.	
15B25	0.22-0.30	0.15-0.30	0.75-1.25	0.040 max.	0.040 max.	
15B41	0.36-0.44	0.15-0.30	1.35-1.65	0.040 max.	0.040 max.	

E 250 Grade as per IS: 2062, 2011