

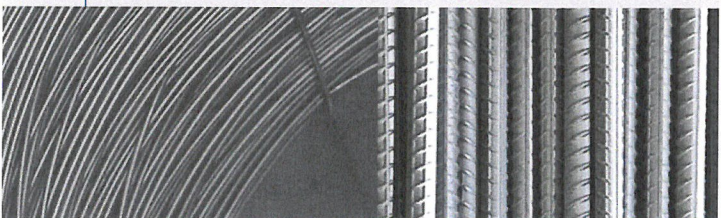
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Review of Measures:

**Steel Rod in Coil and Reinforcing Bar
exported from China**

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Exporter visit briefing – 21 July 2017



PART 1 - THE GOODS

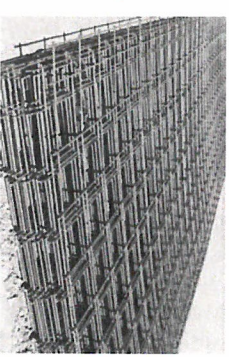
1. What is rod in coil? 2. What is reinforcing bar?

What is Rod in Coil?

- Also known as "wire rod" or "low carbon wire rod" or "wire rod for mesh"
- A steel billet is rolled through a Rod Mill into (<14mm) round rod, exiting the mill as rings on a cooling conveyor and formed into a coil

✓ The goods

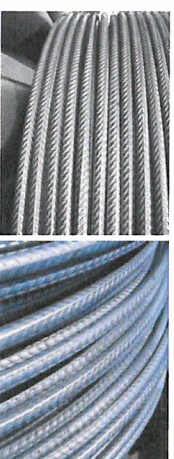
× Not 'the goods'



- Major application in wire mesh manufacturing

What is Reinforcing Bar?

- Also known as "rebar" or "deformed bar" or "TMT bar"
- A steel billet is rolled through a Rod Mill (for coils) or a Bar Mill (for straights). The final set of rolls in the Mills introduce the ribs/deformations into the rod/bar.
- Most common method of production is TMT (thermo-mechanical treatment) using water quenching to achieve required strength.



Spooled or
"wild" coils
or straight
lengths



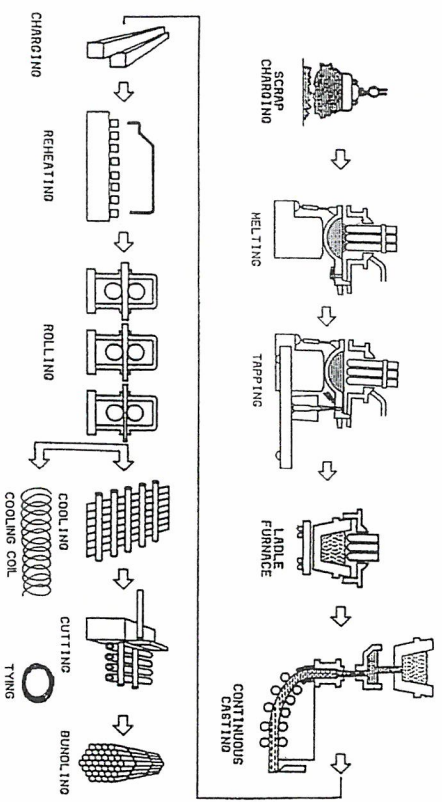
PART 2 - STEELMAKING

1. Blast Furnace/Basic Oxygen Furnace (BOF) production
2. Electric Arc Furnace (EAF) production
3. Microalloying
4. Grades
5. Making s.269TAC(9) adjustments for alloys

Production : Steelmaking Process Routes

[Arrium Steelmaking Operations]

Rod in Coil & Rebar – EAF Production



What do you need to make steel billet?

❖ *Electric Arc Furnace*

Raw materials:

- Scrap
- Fluxes
- Alloys

Electricity

Gas

❖ *Blast Furnace*

- Ore
- Fluxes
- Coke/Coal
- Air
- Gas

❖ *Basic Oxygen Furnace*

- Scrap
- Liquid iron?
- Alloys
- Fluxes
- Oxygen
- Electricity
- Other gas

Microalloying for export – not domestic sale

- Steel products commonly alloyed for export

Chinese exports of steel products alloyed with just 0.3 percent of chromium can get a 9 percent to 1.3 percent tax rebate as part of Beijing's efforts to promote higher-value steel.

[Testing for microalloy additions]

Grades – for Rod

- For mesh : <14mm Low carbon, with manganese & silicon
- No expensive alloys required (chromium, nickel, molybdenum)
- China have added 0.0008% Boron to change tariff to "alloy steel" – export rebate for Boron removed January 2015.

When China removed its export tax rebate for most boron-added steel products at the start of the year, Chinese mills were quick to find a workaround.

They substituted boron with chromium so that their products would continue to enjoy the rebates as alloy steel.

- Need 0.3%Cr to be an "alloy steel"
- Typical chemistry:

Carbon	0.05 - 0.2%
Silicon	0.10 - 0.35%
Manganese	0.25 – 0.90%
Phosphorus	0.045% max
Sulphur	0.05% max

How to determine the deliberate addition of alloys

Other alloy steel

Steels not complying with the definition of stainless steel and containing by weight one or more of the following elements in the proportion shown:

- 0.3% or more of aluminum
- 0.0005% or more of boron
- 0.3% or more of chromium
- 0.3% or more of cobalt
- 0.4% or more of copper
- 0.4% or more of lead
- 1.65% or more of manganese
- 0.05% or more of molybdenum
- 0.3% or more of nickel
- 0.05% or more of niobium
- 0.6% or more of silicon
- 0.05% or more of titanium
- 0.3% or more of tungsten (wolfram)
- 0.1% or more of vanadium
- 0.05% or more of zirconium
- 0.1% or more of other elements (except sulphur, phosphorus, carbon and nitrogen), taken separately

[Testing for microalloy additions]

<https://www.border.gov.au/Business-support-trade-and-goods/importing-goods/tariffs-classification-of-goods/current-tariffs-classification/schedule-3/section-xv/chapter-72>

Specific to Rebar Straights

Basis for sale : Theoretical or actual weight

[Example : comparison of different weight basis for sale]

PART 3 – Understanding compliance with standards

- 1.Rod in coils
- 2.Rebar
- 3.Making s.269TAC(9) adjustments for sales weight basis (specific to rebar straights)

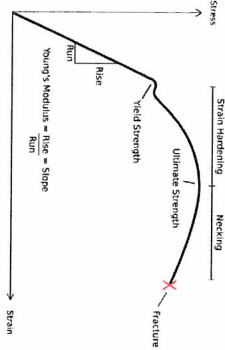
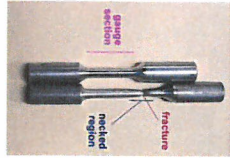
COUNTRY	USA					
STANDARD	SAE J403 / ASTM A510					
GRADE	1006	1008	1010	1012	1015	1018
CHEMICAL COMPOSITION	C	0.08 max	0.10 max	0.09/0.13	0.10/0.15	0.13/0.18
	P	0.030 max	0.030 max	0.030 max	0.030 max	0.030 max
	Mn	0.25/0.40	0.30/0.50	0.30/0.50	0.30/0.50	0.50/0.80
	Si	0.15/0.35	0.15/0.35	0.15/0.35	0.15/0.35	0.15/0.35
S	0.050 max	0.050 max	0.050 max	0.050 max	0.050 max	0.050 max

COUNTRY	Japan					
STANDARD	JIS G 3505					
GRADE	SWRM 6	SWRM 8	SWRM 10	SWRM 12	SWRM 15	SWRM 17
CHEMICAL COMPOSITION	C	0.08 max	0.10 max	0.09/0.13	0.10/0.15	0.13/0.18
	P	0.040 max	0.040 max	0.040 max	0.040 max	0.040 max
	Mn	0.50 max	0.50 max	0.30/0.50 max	0.30/0.50	0.30/0.50
	Si	0.040 max	0.040 max	0.040 max	0.040 max	0.040 max

COUNTRY	China					
STANDARD	GB/T 701					
GRADE	Q195 Q215 Q235					
CHEMICAL COMPOSITION	C	0.06/0.12	0.09/0.15	0.09/0.15	0.17 max	
	P	0.045max	0.045max	0.045max	0.035max	
	Mn	0.25/0.50	0.25/0.55	0.25/0.55	0.35/0.80	
	Si	0.30max	0.30max	0.30max	0.30max	
S	0.05max	0.045max	0.045max	0.03max		

Rebar Standards comparison

Key Requirement	Property	Australia (& ACRS) AS/NZS4671:2001	China GB 1499.2 :2007
Closest grade for model matching		500N	HRB500 / HRBF500
Strength	Yield Stress (MPa)	≥ 500MPa ≤ 650MPa	500MPa to 630MPa
Ductility	Elongation (%A _g)	≥ 5%	7.5%
Weldability	Carbon Equivalent (C _{eq})	0.44 max	0.55
Actual mass close to nominal mass	Mass per metre tolerance (%)	± 4.5% (for all bar diameters)	± 7% (6-12mm diameter) ± 5% (14-20mm diameter) ± 4% (22-50mm diameter)



Carbon equivalent – takes a given chemistry and converts to an Fe-C alloy.

$$C_{eq} = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

Low Carbon Rod Standards - China

China offers & pricing

[Extracts – subscription pricing for Chinese rebar]

Specific to Rebar Straights
Basis for sale : Theoretical or actual weight

[Example : comparison of different weight basis for sale]

PART 4 – The exporters

- 1.Shagang Group
- 2.Hunan Valin



华菱钢铁
VALIN STEEL

**OVERALL VERIFICATION
CHALLENGE:**
RELEVANT, COMPLETE &
ACCURATE COST ALLOCATION



华菱钢铁
VALIN STEEL

[Confidential subscription information:
relative cost indicators]

[Confidential subscription commentary : China domestic freight]

[Confidential subscription information: Chinese wages]

VERIFICATION CHALLENGE 1: RELEVANT AND COMPLETE DOMESTIC AND EXPORT GOODS MODEL MATCHING

Product Presentation

Wire and Heavy Profile	Hot rolled Coil	Cold rolled Coil	Wire Rod	Rebar	Road and Rails	Steel Shapes	Welded Steel Pipe	Special Steel
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Shagang is the largest supplier of premium wire rod products in China. Our wire rod products have the advantages of stable chemical element, minimum deviation, high cleanness, low inclusion, fine metallurgical structure and property, also wide range on specifications and high accuracy on dimensions as well as good surface quality. The quality of the wire product has been awarded by the title of "Quality Gold Cup on Metallurgical Product", "Premium Metallurgical Product" and "National Customers Satisfied Product", etc. which are widely used in the construction engineering, automobile, oil field, mine, and so on. The main products are pre-stressed steel wire, steel strand wire, tire cord wire, wire mesh, cold heading steel, and galvanized steel wire for bridge cable rope, high carbon steel and steel wire for welding.

Product Mix

- (1) PC wire rod for steel wire and strands
- (2) Hot rolled rod for cold heading
- (3) Medium and high carbon steel wire rod
- (4) Quality carbon steel wire rod
- (5) Wire rod for PC steel bar
- (6) Wire rod for alloy steel rod
- (7) Wire rod for reinforcement fiber material in rubber product
- (8) Wire rod for galvanized steel wire
- (9) Wire rod for gas shielded welding wire
- (10) Wire rod for galvanized steel wire and strands
- (11) Steel weld wire rod
- (12) Alloy structural steel rod
- (13) Wire rod for reinforcement with plain surface
- (14) Wire rod of ribbed steel bar
- (15) Low carbon steel round rod
- (16) Bearing steel rod
- (17) Steel wire for cold heading
- (18) Wire rod for low-carbon steel fiber
- (19) Wire rod for copper-clad steel wire
- (20) Wire rod for tire cord
- (21) Wire rod for alloy welding wire

Quality carbon steel wire rod

Typical Product Grade	Diameter (mm)	Executive Standard	Main Application
58~83.15Mn~70Mn	5~20	GB T 4344-2008	Carbon spring steel wire, PC wire,
100Mn, 100Mn~100S	5~20	Q 23082, S01305-2013	high strength quality carbon
45	5~22	Q 23082, S01305-2013	structural steel wire, coated steel
SAE1006~SAE1005	5~20	ASTM A510, A510M-13	wire rope, steel wire rope, and various hardware tools, etc.

Low carbon steel round rod

Typical Product Grade	Diameter (mm)	Executive Standard	Main Application
Q195, Q215, Q235	5~20	GB T 701-2008	Wire drawing