



**LION
GROUP**



Meeting Global Demands

- Amsteel Mills Sdn Bhd
 - Antara Steel Mills Sdn Bhd
- Long Steel Products

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1 From Our Group Executive Chairman

*"We aim to be among the top
10% lowest-cost steel producers
in the world"*



Tan Sri William Cheng
Group Executive Chairman
The Lion Group

The Lion Group, since its venture into the foundry business and subsequent expansion into steelmaking operations, has continued to tap business opportunities arising from the nation's economic growth and development.

Today, as a diversified business group with interests in various fields, the Group remains focused on developing its steel manufacturing business. To date, the Group has invested more than RM8 billion in the local steel industry, and is planning to invest another RM5 billion in new processes and technologies to reduce costs, increase productivity and improve quality. This includes investing in new projects especially in upstream iron and steelmaking, which will enable us to supply high quality steel to support the development of higher value-added downstream activities.

We are committed to work closely together with our business associates; whether distributors, downstream manufacturers, end-users, traders or suppliers. We need to cooperate and work with each other in order to develop the industry and bring about mutual

benefits for everyone. Both upstream and downstream producers depend on each other to grow their businesses and supply all kinds of steel products to support the country's manufacturing, engineering, fabrication and infrastructural requirements. The availability of competitive feedstock from our steelmaking plants will enhance the competitiveness of the downstream industries and encourage greater exports.

A strong, integrated steel industry will help the local economy withstand the cyclical pressures of the industry and global competition as well as take advantage of the opportunities arising from increasing trade liberalisation.

The Group's Steel Division is determined to be one of the largest and most efficient steel producers in this region, and is poised to achieve this with the various upgrading and expansion projects. With the continuous support of the authorities and our business partners, and the commitment of our employees in the Steel Division, I am confident the Group will be able to realise its vision of being among the top 10% lowest-cost steel producers in the world.

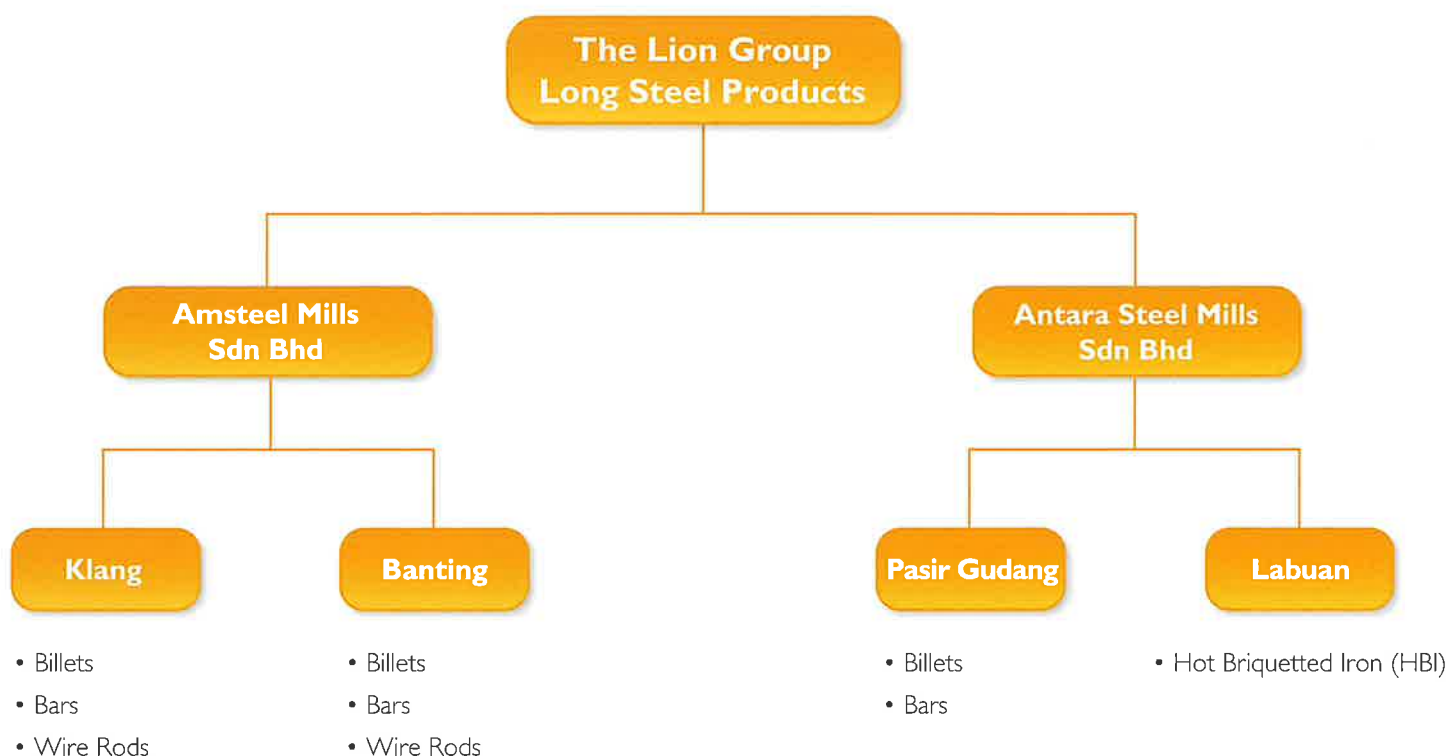


2 Long Steel Products Unit

Mission Statement



Corporate Structure



3 Growing From Strength To Strength

As the nation progressively grows towards an era of industrialisation, the consumption of steel has increased in line with the demands of industry. Long regarded as the backbone of the manufacturing sector and the country's industrialisation programme, steel is an important basic material required by all spheres of development and contributes to nation-building.

This has laid the platform for the growth of Amsteel Mills Sdn Bhd and Antara Steel Mills Sdn Bhd, both under the Lion Group's long steel products unit, and together, forming one of the largest and more modern steel mills in South East Asia.

With steel as its core business for more than half a century, the Lion Group's long steel products unit operates three steel mills producing billets, steel bars and wire rods, and a Hot Briquetted Iron (HBI) plant.

The Group's steel bars and wire rods are used in the construction, fabrication and manufacturing industries. Its HBI, which is manufactured from high-purity iron ore, is supplied to steel mills to make good quality steel required for high-end applications. The Group's long steel products unit has a steelmaking capacity of 3.05 million tonnes and rolling capacity of 2.35 million tonnes of steel bars and wire rods per annum. Its HBI operation has an annual capacity of 880,000 tonnes.



Amsteel Mills Klang

Amsteel Mills' first rolling mill was commissioned in 1978 in Klang, Selangor. It is equipped with modern facilities comprising a 100-ton Electric Arc Furnace, Ladle Furnace and a 6-strand Continuous Casting Machine to produce billets for rolling into steel bars and wire rods at its three Rolling Mills.



Amsteel Mills Banting (Amsteel II)

Amsteel Mills' expansion in Banting, Selangor, Amsteel II was established in 2001 to produce special grade billets for rolling into specialty bars and wire rods for automotive parts, mattress and mechanical springs, turning parts, wire ropes and other stringent applications. Equipped with first-rate facilities, it has a 160-ton Electric Arc Furnace, Ladle Furnace and a 6-strand Continuous Casting Machine, and a Rolling Mill capable of producing both bars and wire rods.

Antara Steel Mills Pasir Gudang

Antara Steel Mills located in Pasir Gudang, Johor, was acquired by the Lion Group in 2002 from Johor Corporation Bhd. It has a 100-ton Electric Arc Furnace, Ladle Furnace, 6-strand Continuous Casting Machine, and two Rolling Mills to produce steel bars.



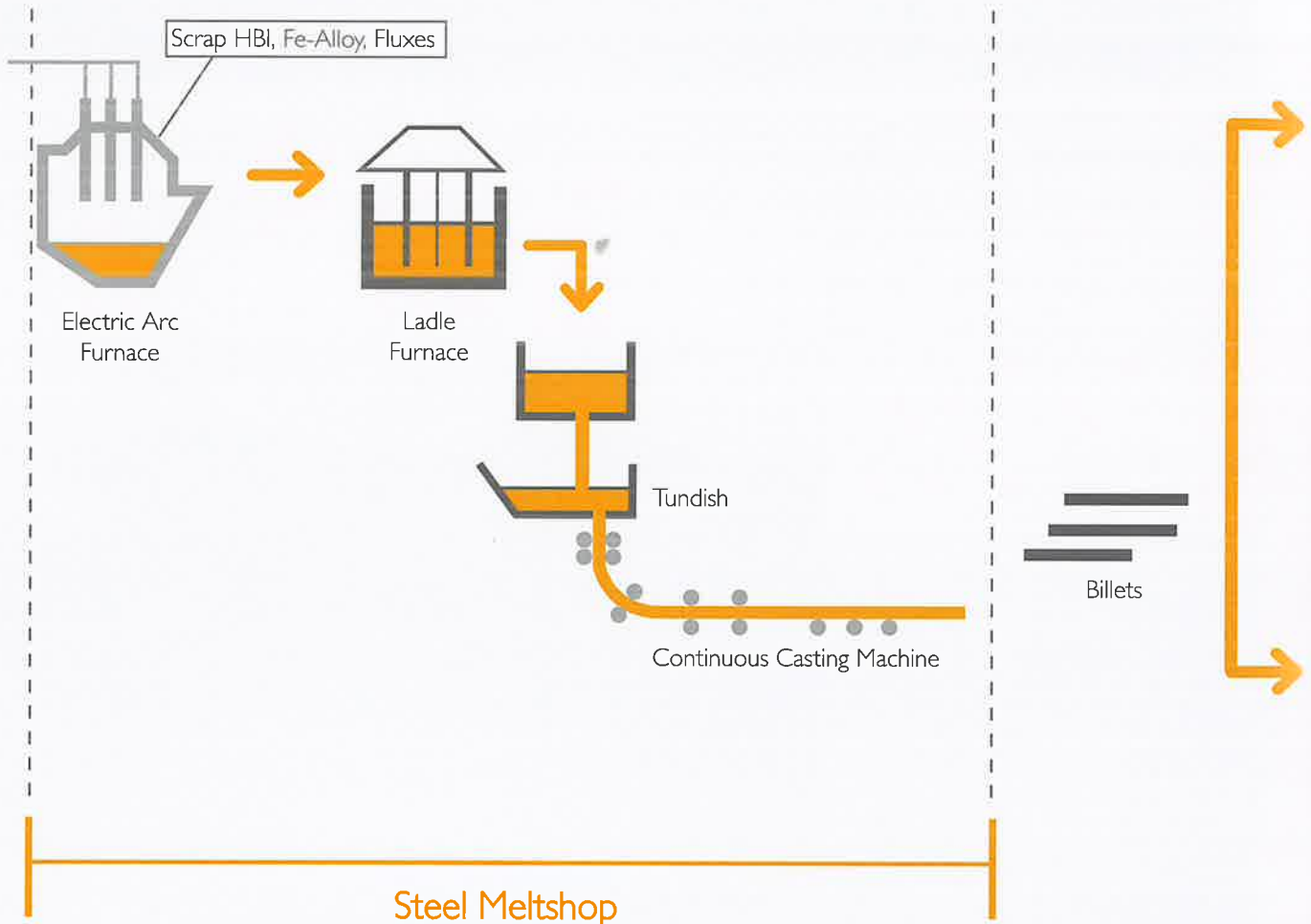
Antara Steel Mills Labuan

Antara Steel Mills Labuan operates a Hot Briquetted Iron (HBI) plant using the Midrex Direct Reduction technology that converts Iron Ore into high-purity Direct Reduced Iron (DRI) or HBI for ironmaking, steelmaking and foundry applications. The HBI plant utilizes a Shaft Furnace and Reformer to reduce iron ore, using natural gas, to produce reduced iron with 93.5% metallisation.



4 Unparalleled Productivity

Production Process Flow Chart



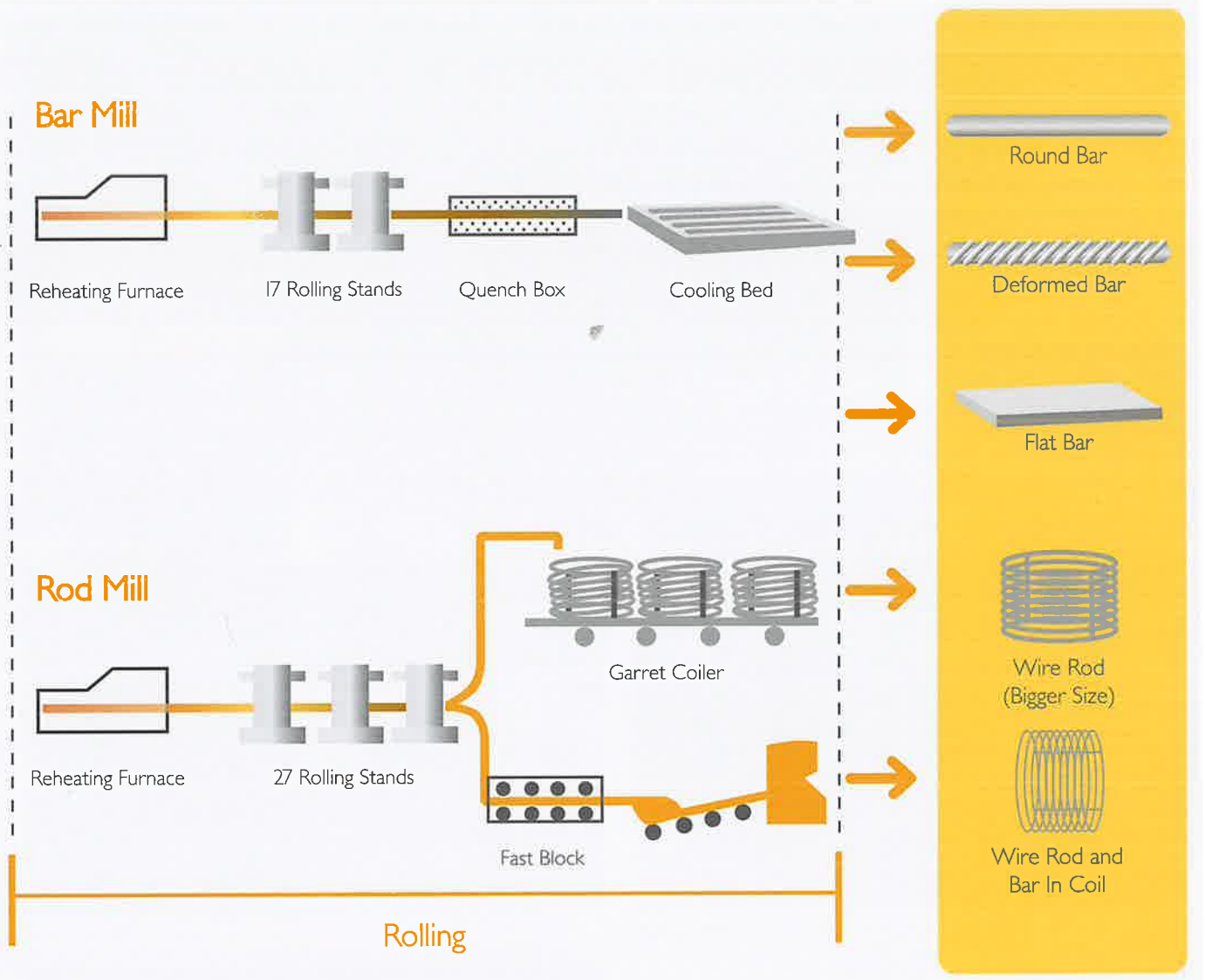
Steelmaking

The steel meltshop in Amsteel Mills Klang was established in 1982 with an 85-ton Electric Arc Furnace (EAF), subsequently upgraded to 100-ton, and a 6-strand Continuous Casting Machine (CCM) to produce billets. The Ladle Furnace (LF) was installed in 1985 as part of the mills' quality improvement programme to produce high grade billets.

Amsteel's new meltshop in Banting under Amsteel II comprises a 160-ton Direct Current EAF, LF, Vacuum Oxygen Degassing (VOD) and a 6-strand CCM featuring

full shroud or submerged nozzle operation (stopper rod system), mould EMS and hydraulic oscillators. The 10m radius casting machine is designed for high speed casting of 130mm to 160mm billets in a wide range of special engineering steel including free-cutting and cold heading quality for the downstream industries.

The steel meltshop in Antara is similarly equipped with a 100-ton EAF, LF and a 6-strand CCM to produce billets.



Rolling

Amsteel Mills' rolling facilities consist of two Bar Mills and a Wire Rod Mill in Klang, and a Rolling Mill capable of producing both bars and wire rods in Banting. The two Rolling Mills in Antara produce steel bars.

The Wire Rod Mill in Amsteel Klang is a tandem mill with finishing speed of 80 metres per second for 5.5mm rod. This mill incorporates the Stelmor Controlled air-cooling system with technologies from Danieli and Morgan for the production of cold-heading and high carbon wire rods.



5 State-of-the-Art Production Facilities



Electric Arc Furnace



Continuous Casting Machine



Continuous Casting Machine Cooling Bed



Rolling Stand

In order to meet the demand for quality bars and rods by the downstream industries, Amsteel II in Banting was commissioned in 2001. Its Rolling Mill incorporates some of the most advanced technologies, such as Walking Beam Furnace, High Pressure Descaler, Horizontal-Vertical No-Twist Strands, Pefinishing Mill, Twin Module Fast Block running at 120 metres per second for 5.5mm rods, plus state-of-the-art Stelmor Controlled Cooling system.

The deformed bars produced range from 10mm to 50mm, while the round bars including for engineering applications range from 5.8mm to 50mm. The flat bar thickness is from 4.5mm to 12mm, and the angle bar sizes are from 25mm x 25mm x 2.8mm up to 100mm x 100mm x 12mm. The wire rod sizes are from 5.5mm to 20.5mm, with the bigger size wire rods from the Garret Coiler ranging from 16mm to 32mm.



Wire Rod Coiler

6 Cut & Bend Services by Amsteel Mills



Traditionally, steel reinforcements are fabricated at the construction site by using manually operated machines. This type of operation is not suitable for fast track jobs due to high wastage, space constraint, and demanding time and labour requirements.

Amsteel Mills' Cut & Bend Section assumes the role of a comprehensive **"One Stop Services Centre"** providing every solution to meet clients' steel supply needs. This includes steel bars which are cut and bent as well as of stock length.

Equipped with modern machinery of advanced technology for cutting and bending of steel, Amsteel's Cut & Bend Section is able to produce at high capacity with automation which results in shorter delivery lead times and higher accuracy in profiled dimensions.

Amsteel's Cut & Bend operations are managed by a team of experienced management and technical staff with competency and expertise in the following areas:

- Technical: Detailing and On-site Coordination
- Fabrication Work
- Delivery and Logistics

The Bar Bending schedules are prepared by highly qualified and experienced engineers. The participatory and integrative nature of the Amsteel team's involvement with clients' daily operations ensure responsive and proactive services rendered to clients which will enhance the overall effectiveness and efficiency of their operations.

Cut & Bend advantages:

- Cost-savings with complete control over steel wastage
- Huge savings in time
- Work smarter with less labour on site
- Better utilisation of space on site
- Better management of steel on site
- Exact dimensions with computer-assisted production
- Exact production and delivery schedules

The following technical services are offered:

- Analysing of structural drawings
- Preparation of cutting and bending schedules from consultants or contractor - approved drawings
- Obtaining approvals for the cutting and bending schedules
- Preparation of summary and detailed breakdown of quantity supplied for client's verification on a monthly basis
- Attending site progress meetings if applicable
- Preparing site delivery schedule based on master programme

7 Our Steel Products



Billets



Steel Bars



Flat Bars

It is the policy of the Lion Group's long steel products unit to achieve maximum customer satisfaction. Hence, providing customers with quality products that meet their requirements according to international specifications is an integral part of the Group's steel production operations.



Wire Rods

8 Quality Assurance



Lion steel products quality is ensured by a stringent Quality Assurance Programme from raw materials to finished products.

Our mills' dedication to high quality systems and assurance have been recognised with them being awarded the ISO9002 Quality System.

We place great emphasis on research and development to constantly upgrade our position as a supplier of quality products and to better fulfill the current and future needs of our customers.

The Quality Control Department in all our mills continuously monitors and checks all jobs from start till finish to ensure that the highest quality expected by customers is built into every job.

Our mills' Quality Policy is based on the following premise:

- Customers' Satisfaction
- Excellent Quality
- Continuous Improvement
- Involvement of the People
- Timely Delivery
- Competitive Price

9 Supporting Downstream Industries

Steel as a basic raw material is used in a wide range of applications from construction to fabrication, engineering and manufacturing. In this respect, the Lion Group's long steel products unit plays an important role in the supply of raw materials for downstream manufacturing and infrastructural development.



Chain Link Fencing



Construction



Wire Mesh



Nails



Galvanised Wire



Bolts and Nuts



Wire Ropes



Barbed Wire

10 Prestigious Projects Using Our Bars



KLCC Petronas Towers



Penang Bridge



Penang Second Bridge



Kuala Lumpur International Airport



Port of Tanjung Pelepas



Legoland Theme Park Malaysia



Paragon Residence



KL Monorail



IB Tower, Kuala Lumpur



Extension of North Butterworth Container Terminal



Smart Tunnel, Kuala Lumpur



Vale Jetty, Sri Manjung

11 Hot Briquetted Iron... Premium Feedstock For Steelmaking



The Midrex Direct Reduction process, used by Antara Steel Mills' HBI plant, is the most successful sponge ironmaking process in the world and accounts for 60% of the world output of Direct Reduced Iron (DRI). Antara's HBI plant in Labuan consists of a counter current Shaft Furnace for the reduction of iron ore, using natural gas as feed to a Reformer, containing 432 nickel-catalyst filled tubes to produce hydrogen (H₂) and carbon monoxide (CO) as reductants. These reductants reduce the iron oxide flowing downward by gravity through the Shaft Furnace to produce reduced iron with 93.5% metallisation.

Hot Briquetted Iron (HBI) from Antara Steel Mills is rated as among the world's best. Its clean, consistent chemistry, controlled carbon content and high metallisation make it a premium feed material in steelmaking operations.

Advantages Of HBI

HBI allows predictable steel quality and control over residual elements. Significant time and cost savings are obtained with its high bulk density (2.4 to 2.6mt/m³) over that of scrap.

Other advantages of HBI are as follows:

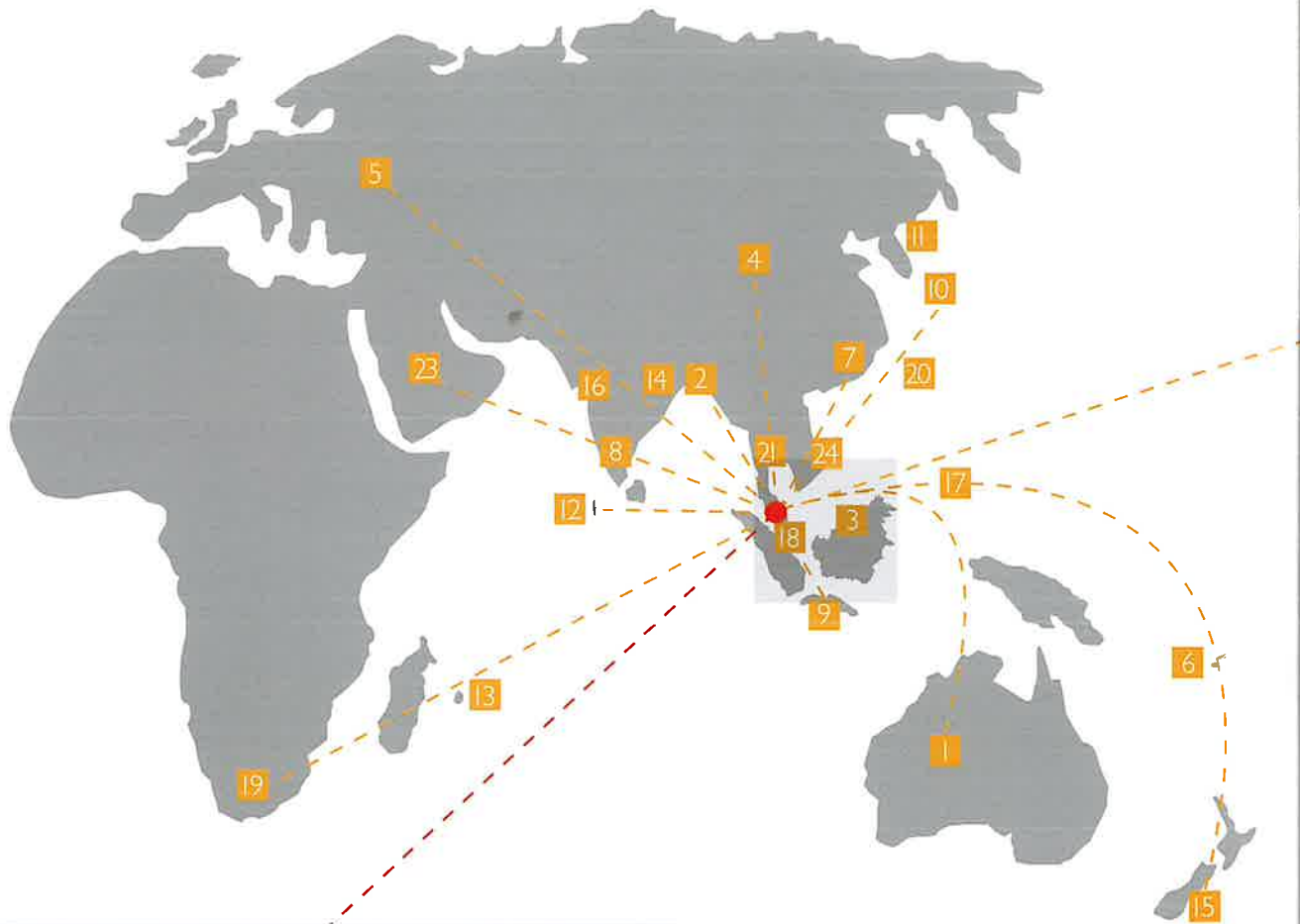
- Low contents of sulphur and phosphorus resulting in shorter refining time.
- Greater ease of handling, storage and charging over other ferrous bearing materials.
- Distinct advantages in storage, handling and shipping.
- Excellent resistance to oxidation, and can be stored in the open under all weather conditions.
- Easy and safe to ship and enjoys preferential status compared to sponge iron under the International Maritime Organisation (IMO) Rules and trans-oceanic voyages.

Quality Advantages Of EAF Steelmaking

The chemical purity of HBI is a major advantage to EAF steelmakers for controlling the chemistry of steel produced.

- The high metallic iron content, consistent chemical composition and low residual element levels of HBI permit the production of higher quality steel. By using HBI, aviation, nuclear and deep drawing grades of steel can also be produced.
- Number of off-grade heats is reduced.
- Mechanical properties of finished steel are enhanced.
- Segregation is reduced with better control of sulphur and phosphorus.
- Lower levels of inclusions, and hydrogen and nitrogen in finished steel.
- Shorter Tap-to-Tap time improves electricity consumption.
- Improved scrap density results in more stable production.
- Lower electrode breakages.

12 Strategic Location



Centrally Located

Strategically located in the Klang Valley in Peninsular Malaysia, its proximity to Malaysia's premier port, Port Klang, makes Amsteel Mills ideally placed to cater to the requirements of domestic customers as well as international markets. Antara Steel Mills' location in the south of Peninsular Malaysia is also well placed to cater to the southern region including the Asean market.

A commitment towards prompt and reliable delivery services has enabled Amsteel Mills and Antara Steel Mills to gain both local and international acceptance and customer satisfaction in its products and services.

13 Meeting Global Demands



Export Markets

The Lion Group's long steel products operations through Amsteel Mills and Antara Steel Mills have certainly put Malaysia on the map as a centre of product excellence.

The Group's steel products are exported to more than 30 countries worldwide and has forged the Lion Group's name as one of the reputable mills in supplying quality steel products, with its bars, wire rods and HBI gaining worldwide acceptance from international markets like Japan, China, Taiwan, United States of America, Hong Kong, Vietnam, the Philippines, Thailand, Indonesia, Singapore, Brunei, Maldives, Mauritius, South Africa, United Arab Emirates, India, Bangladesh, Pakistan, Australia, New Zealand, and European Union countries.

Export Markets

- | | | |
|----------------------------|----------------|-----------------------------|
| 1 Australia | 9 Indonesia | 17 Philippines |
| 2 Bangladesh | 10 Japan | 18 Singapore |
| 3 Brunei | 11 South Korea | 19 South Africa |
| 4 China | 12 Maldives | 20 Taiwan |
| 5 European Union Countries | 13 Mauritius | 21 Thailand |
| 6 Fiji | 14 Nepal | 22 United States of America |
| 7 Hong Kong | 15 New Zealand | 23 United Arab Emirates |
| 8 India | 16 Pakistan | 24 Vietnam |

14 Winning Strategies

The growth and expansion of Lion Group's steel operations is fuelled by a successful combination of human talents, industrial advancements, modern technology and commitment to quality.



Compliance With International Standards

Great emphasis is placed on research and development to constantly upgrade the Group's long steel products unit as a manufacturer of quality products, as well as to better fulfil the current and future needs of its customers. A stringent Quality Assurance Programme from raw materials to finished products ensures the quality of the Group's steel products, which are manufactured to International Standards such as JIS, ASTM, DIN, BS, EN, DNV and etc. Amsteel Mills is the first steel mill in Malaysia to be awarded the British Standard BS 4449.

Human Resource Development

Employing advanced technologies, intensifying research & development, enhancing employee skills and developing the organisation's core competencies are on-going measures to entrench the Group's position as a leading steel manufacturer of quality bars and wire rods. Recognizing the importance of its human resource, the career development of its staff remains a priority of the Group. Various training programmes are arranged for all levels of staff to upgrade their skills and help them achieve their full potential within the Group's continuous learning environment.



Collaboration With Downstream Industries

The Group is committed to work with its customers and downstream manufacturers to enhance their competitiveness. Through its technical support programme, the Group is assisting the downstream industries to jointly develop their products and to export. Visits by its technical team to customers' factories, and constant dialogue with end-users provide the necessary feedback for the Group to cater to their requirements and develop new grades for the industry to grow.

Caring For The Environment

While emphasising on technology and industry development, the Group is mindful of the need to protect the environment.

Both Amsteel Mills and Antara Steel Mills comply with the environmental laws and regulations governing the steel industry in the country, and have invested substantially in a state-of-the-art Dedusting System with Baghouse and Automatic Drive Control System.





Long Steel Products

KLANG

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41050 Klang
Selangor Darul Ehsan

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(6)03-3342 1923 (Factory)

BANTING

Amsteel Mills Sdn Bhd (Amsteel II)
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Selangor Darul Ehsan

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F: (6)03 - 3187 0620

PASIRGUDANG

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Kawasan Perindustrian Pasir Gudang
81707 Pasir Gudang
Johor Darul Takzim

T: (6)07 - 251 2021
F: (6)07 - 251 5175

LABUAN

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Wilayah Persekutuan

T: (6)087 - 411 300
F: (6)087 - 417 122/092

Marketing Office

Amsteel Mills Marketing Sdn Bhd
Wisma Lion, Kawasan Perindustrian Olak Lempit,
Mukim Tanjung 12, 42700 Banting, Selangor Darul Ehsan
T: (6)03 - 3182 2200 / 3182 5888 F: (6)03 - 3182 2356 / 7

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Wire Rods

Standard Sizes and Coil Specifications

Regular Rolling Sizes	5.5mm 10.0mm	6.5mm 11.0mm	7.0mm 12.0mm	8.0mm 14.0mm	9.0mm
Coil Weight	Approximately 1500kg - 2000kg per continuous coil				
Inner Diameter	Min 900mm				
Outer Diameter	Max 1250mm				
Note :	Other special sizes can be supplied on request 6.0mm 13.0mm 17.0mm 19.0mm 20.5mm 23.0mm 27.0mm 30.0mm				

Quality and Specifications of Steel Wire Rods

ASM products comply to most international standards such as JIS, ASTM, DIN, BS and etc.



High Carbon Steel Wire Rods

Specification : AISI / SAE

Grade No	Chemical Composition (%)			
	C	Mn	P	S
1030	0.28 - 0.34	0.60 - 0.90	0.040 Max	0.050 Max
1038	0.35 - 0.42	0.60 - 0.90	0.040 Max	0.050 Max
1042	0.40 - 0.47	0.60 - 0.90	0.040 Max	0.050 Max
1045	0.43 - 0.50	0.60 - 0.90	0.040 Max	0.050 Max
1050	0.48 - 0.55	0.60 - 0.90	0.040 Max	0.050 Max
1055	0.50 - 0.60	0.60 - 0.90	0.040 Max	0.050 Max
1065	0.60 - 0.70	0.60 - 0.90	0.040 Max	0.050 Max
1070	0.65 - 0.75	0.60 - 0.90	0.040 Max	0.050 Max
1074	0.70 - 0.80	0.50 - 0.80	0.040 Max	0.050 Max

Specification : JIS G 3506

Grade No	Chemical Composition (%)				
	C	Si	Mn	P	S
SWRH 42A	0.39 - 0.46	0.15 - 0.35	0.30 - 0.60	0.030 Max	0.030 Max
SWRH 47A	0.44 - 0.51	0.15 - 0.35	0.30 - 0.60	0.030 Max	0.030 Max
SWRH 52A	0.49 - 0.56	0.15 - 0.35	0.30 - 0.60	0.030 Max	0.030 Max
SWRH 57A	0.54 - 0.61	0.15 - 0.35	0.30 - 0.60	0.030 Max	0.030 Max
SWRH 62A	0.59 - 0.66	0.15 - 0.35	0.30 - 0.60	0.030 Max	0.030 Max
SWRH 67A	0.64 - 0.71	0.15 - 0.35	0.30 - 0.60	0.030 Max	0.030 Max
SWRH 72A	0.69 - 0.76	0.15 - 0.35	0.30 - 0.60	0.030 Max	0.030 Max

Grade No	Chemical Composition (%)				
	C	Si	Mn	P	S
SWRH 42B	0.39 - 0.46	0.15 - 0.35	0.60 - 0.90	0.030 Max	0.030 Max
SWRH 47B	0.44 - 0.51	0.15 - 0.35	0.60 - 0.90	0.030 Max	0.030 Max
SWRH 52B	0.49 - 0.56	0.15 - 0.35	0.60 - 0.90	0.030 Max	0.030 Max
SWRH 57B	0.54 - 0.61	0.15 - 0.35	0.60 - 0.90	0.030 Max	0.030 Max
SWRH 62B	0.59 - 0.66	0.15 - 0.35	0.60 - 0.90	0.030 Max	0.030 Max
SWRH 67B	0.64 - 0.71	0.15 - 0.35	0.60 - 0.90	0.030 Max	0.030 Max
SWRH 72B	0.69 - 0.76	0.15 - 0.35	0.60 - 0.90	0.030 Max	0.030 Max

Carbon Steel Wire Rods for Cold Heading and Cold Forging

Specification : JIS G 3507

Grade No	Chemical Composition (%)					
	C	Si	Mn	P	S	AL
SWRCH 8R	0.10 Max	-	0.60 Max	0.040 Max	0.040 Max	-
SWRCH 6A	0.08 Max	0.10 Max	0.60 Max	0.030 Max	0.035 Max	0.020 Min
SWRCH 8A	0.10 Max	0.10 Max	0.60 Max	0.030 Max	0.035 Max	0.020 Min
SWRCH 18A	0.15 - 0.20	0.10 Max	0.60 - 0.90	0.030 Max	0.035 Max	0.020 Min
SWRCH 22A	0.18 - 0.23	0.10 Max	0.70 - 1.00	0.030 Max	0.035 Max	0.020 Min
SWRCH 35K	0.32 - 0.38	0.10 - 0.35	0.60 - 0.90	0.030 Max	0.035 Max	-
SWRCH 38K	0.35 - 0.41	0.10 - 0.35	0.60 - 0.90	0.030 Max	0.035 Max	-
SWRCH 40K	0.37 - 0.43	0.10 - 0.35	0.60 - 0.90	0.030 Max	0.035 Max	-



Low Carbon Steel Wire Rods

Specification : AISI / SAE

Grade No	Chemical Composition (%)			
	C	Mn	P	S
1006	0.08 Max	0.25 - 0.40	0.040 Max	0.050 Max
1008	0.10 Max	0.30 - 0.50	0.040 Max	0.050 Max
1010	0.08 - 0.13	0.30 - 0.60	0.040 Max	0.050 Max
1012	0.10 - 0.15	0.30 - 0.60	0.040 Max	0.050 Max
1015	0.13 - 0.18	0.30 - 0.60	0.040 Max	0.050 Max
1017	0.15 - 0.20	0.30 - 0.60	0.040 Max	0.050 Max
1018	0.15 - 0.20	0.30 - 0.60	0.040 Max	0.050 Max

Specification : JIS G 3505 : 2004

Grade No	Chemical Composition (%)				
	C	Si	Mn	P	S
SWRM 6R	0.08 Max	TRACE	0.06 Max	0.040 Max	0.040 Max
SWRM 8R	0.10 Max	TRACE	0.06 Max	0.040 Max	0.040 Max
SWRM 10R	0.08 - 0.13	TRACE	0.30 - 0.60	0.040 Max	0.040 Max
SWRM 12R	0.10 - 0.15	TRACE	0.30 - 0.60	0.040 Max	0.040 Max
SWRM 15R	0.13 - 0.18	TRACE	0.30 - 0.60	0.040 Max	0.040 Max

Grade No	Chemical Composition (%)				
	C	Si	Mn	P	S
SWRM 8K	0.01 Max	0.17 Max	0.60 Max	0.040 Max	0.040 Max
SWRM 10K	0.08 - 0.13	0.17 Max	0.30 - 0.60	0.040 Max	0.040 Max
SWRM 12K	0.10 - 0.15	0.17 Max	0.30 - 0.60	0.040 Max	0.040 Max
SWRM 15K	0.13 - 0.18	0.17 Max	0.30 - 0.60	0.040 Max	0.040 Max

Remark : When killed steel is specified, the letter K shall be suffixed to the end of the symbol of grade

Wire Rods for Core Wire of Welding Electrode

Specification : JIS G 3503 : 2006

Grade No	Chemical Composition (%)					
	C	Si	Mn	P	S	Cu
SWRY 11	0.09 Max	0.03 Max	0.35 - 0.65	0.020 Max	0.023 Max	0.20 Max

(Rimmed Substitute Equivalent to JIS G 3505 SWRY 11)

Grade No	Chemical Composition (%)					
	C	Si	Mn	P	S	Cu
WE 0909	0.09 Max	0.06 Max	0.35 - 0.65	0.020 Max	0.023 Max	0.20 Max



Low Carbon Steel Wire Rods for Fine Drawing

(Rimmed Substitute Equivalent to JIS G 3505 8R)

Grade No	Chemical Composition (%)				
	C	Si	Mn	P	S
FD 0408	0.05 Max	0.06 Max	0.20 - 0.25	0.015 Max	0.015 Max
FD 0609	0.06 Max	0.06 Max	0.23 - 0.32	0.015 Max	0.015 Max

Steel Wire Rods for MAG Welding Solid Wire

Grade No	Chemical Composition (%)					
	C	Si	Mn	P	S	Cu
CO 0608 - S4	0.04 - 0.10	0.65 - 0.85	1.00 - 1.50	0.020 Max	0.020 Max	0.20 Max
CO 0608 - S6	0.04 - 0.10	0.80 - 1.15	1.40 - 1.85	0.020 Max	0.020 Max	0.20 Max

Rolled Wire Rods for Pre-Stressed Concrete Bars

Grade No	Chemical Composition (%)				
	C	Si	Mn	P	S
UB 30Si	0.29 - 0.33	1.50 - 2.00	0.60 - 0.90	0.020 Max	0.020 Max
UB 35Si	0.34 - 0.38	1.50 - 2.00	0.60 - 0.90	0.020 Max	0.020 Max

Wire Rods for Steel Wool Application

Grade No	Chemical Composition (%)				
	C	Si	Mn	P	S
SW0831	0.06 - 0.11	0.10 Max	0.80 - 1.00	0.040 - 0.080	0.020 Max



Hot Rolled Mild Steel Flat Bar

Weight Table and Sizes for JIS G 3101 : 2010 Standard

Size (mm x mm)	Cut Length	Packing	Piece / Bundle	MT / Bundle	Nominal Rolling Mass (kg/m)
4.5 X 25	6m	6 X 31	186	0.985	0.883
6.0 X 25	6m	7 X 20	140	0.988	1.178
9.0 X 25	6m	7 X 13	91	0.964	1.766
12.0 X 25	6m	7 X 10	70	0.989	2.355
4.5 X 32	6m	5 X 29	145	0.983	1.13
6.0 X 32	6m	5 X 22	110	0.994	1.507
9.0 X 32	6m	6 X 12	72	0.976	2.261
12.0 X 32	6m	5 X 11	55	0.994	3.014
4.5 X 38	6m	4 X 30	120	0.966	1.342
6.0 X 38	6m	4 X 23	92	0.987	1.79
9.0 X 38	6m	4 X 15	60	0.966	2.685
12.0 X 38	6m	5 X 9	45	0.966	3.58
4.5 X 50	6m	3 X 31	93	0.985	1.766
6.0 X 50	6m	3 X 23	69	0.974	2.355
9.0 X 50	6m	3 X 15	45	0.953	3.533
12.0 X 50	6m	3 X 11	33	0.932	4.71
4.5 X 65	6m	3 X 24	72	0.991	2.296
6.0 X 65	6m	3 X 18	54	0.991	3.062
9.0 X 65	6m	3 X 12	36	0.991	4.592
12.0 X 65	6m	3 X 9	27	0.991	6.123
6.0 X 75	6m	2 X 23	46	0.974	3.533
9.0 X 75	6m	2 X 15	30	0.953	5.299
12.0 X 75	6m	2 X 11	22	0.932	7.065
6.0 X 100	6m	2 X 28	36	1.017	4.71
9.0 X 100	6m	2 X 12	24	1.017	7.065
12.0 X 100	6m	2 X 23	18	1.017	9.42

Specification

Spec	Grade	Chemical Composition (%)			Mechanical Properties			For 180° Bend Test (mm)
		P	S	Min Yield (N/mm ²)	Min Tensile (N/mm ²)	Min Elongation (%)		
						T<5mm	5≤ T< 16mm	
JIS G 3101:2010	Mild Steel Flat Bar SS400	0.050 Max	0.050 Max	>245	400 - 510	≥ 21	≥17	1.5t



Hot Rolled Steel Bars for The Reinforcement of Concrete

Weight Table and Sizes for MS 146 : 2014 Standards

Normal Diameter (mm)	10	12	13	16	20	22	25	28	32	40	50
Cross-Sectional Area (mm ²)	78.5	113	133	201	314	380	491	616	804	1257	1963
Mass Per Meter Run (Kg/m)	0.617	0.888	1.04	1.58	2.47	2.98	3.85	4.83	6.31	9.86	15.4
Pieces Per Bundle (12m)	138	96	80	54	34	28	22	18	14	9	11
Normal Weight Per Bundle (MT)	1.022	1.023	0.998	1.024	1.008	1.001	1.016	1.043	1.060	1.065	2.033
Deviation Over and Under The Nominal Mass Per Meter Run (%)	±4.5%										

Weight Table and Sizes for MS 144 : 2014 Standards

Normal Diameter (mm)	5.5	6	6.5	7	8	9	10	12
Cross-Sectional Area (mm ²)	23.8	28.3	33.1	38.5	50.3	63.6	78.5	113
Mass Per Meter Run (Kg/m)	0.187	0.222	0.260	0.302	0.395	0.499	0.617	0.888
Pieces Per Bundle (12m)	450	375	320	276	200	168	138	96
Normal Weight Per Bundle (MT)	1.010	0.999	0.998	1.000	0.948	1.006	1.022	1.023
Deviation Over and Under The Nominal Mass Per Meter Run (%)	±6.0%							
	±4.5%							

Weight Table and Sizes for MS 146 : 2006 And BS 4449 : 1997 Standards

Normal Diameter (mm)	10	12	13	16	20	22	24	25	28	32	36	38	40	50
Cross-Sectional Area (mm ²)	78.50	113.10	132.70	201.10	314.20	380.10	452.40	490.90	615.80	804.20	1017.90	1134.10	1256.60	1963.50
Mass Per Meter Run (Kg/m)	0.616	0.898	1.042	1.579	2.466	2.984	3.551	3.854	4.834	6.313	7.991	8.903	9.864	15.413
Pieces Per Bundle (12m)	138	96	80	54	34	28	24	22	18	14	11	10	9	6
Normal Weight Per Bundle (MT)	1.020	1.023	1.000	1.023	1.006	1.003	1.023	1.017	1.044	1.061	1.055	1.068	1.065	1.110
Deviation Over and Under The Nominal Mass Per Meter Run (%)	±6.5%													
	±4.5%													

Weight Table and Sizes for SS2 Part 2 & Part 1 : 1999 Standards

Normal Diameter (mm)	10	12	13	16	20	22	26	28	32	38	40
Cross-Sectional Area (mm ²)	78.5	113.1	133.0	201.1	314.0	380.0	491.0	616.0	804.0	1134.0	1256.6
Mass Per Meter Run (Kg/m)	0.617	0.888	1.042	1.579	2.466	2.984	3.854	4.834	6.313	8.905	9.864
Pieces Per Bundle (12m)	138	96	80	54	34	28	24	22	18	14	11
Normal Weight Per Bundle (MT)	1.022	1.023	1.000	1.023	1.006	1.003	1.023	1.017	1.044	1.061	1.055
Deviation Over and Under The Nominal Mass Per Meter Run (%)	±5.0%										
	±4.0%										

Weight Table and Sizes for AS/NZS 4671 : 2001 And BS 4449 : 2005 GB500B Standards

Normal Diameter (mm)	10	12	16	20	24	25	28	32	36	40	50
Cross-Sectional Area (mm ²)	78.5	113	201	314	452	491	616	804	1020	1257	1963
Mass Per Meter Run (Kg/m)	0.617	0.888	1.58	2.47	3.55	3.85	4.83	6.31	7.99	9.86	15.4
Pieces Per Bundle (12m)	138	96	54	34	24	22	18	14	10	9	11
Normal Weight Per Bundle (MT)	1.022	1.023	1.024	1.008	1.023	1.017	1.044	1.061	1.068	1.065	2.033
Deviation Over and Under The Nominal Mass Per Meter Run (%)	±4.5%										



Hot Rolled Steel Bars for The Reinforcement of Concrete

Specification	Grade	Chemical Composition (%)						Size (mm)	Min Yield (N/mm ²)	Min Tensile (N/mm ²)	Min Stress Ratio	Min El. GL = 5.65√S ₀ (%)	Total El. of Max Load Min Agr. (%)	Former Ø for 180° Bend Test(mm)	Former Ø for 45° Reband Test(mm)	Former Ø for 90° Reband Test(mm)
		C% Max	Si% Max	Mn% Max	P% Max	S% Max	CE% Max									
MS 144 : 2014	Plain Bar G250	0.22	-	-	0.050	0.050	0.42	5.5 - 12	250	-	1.15	-	5	2D	-	-
MS 146 : 2014	High Yield Deformed Bar GB500B	0.22	-	-	0.050	0.050	0.50	All Sizes	500 - 600	-	1.08	-	5	-	-	≤ 16 = 4D > 16 = 7D
MS 146 : 2006	Plain Bar G250	0.25	-	-	0.060	0.060	0.42	All Sizes	250	-	1.05	22	-	2D	2D	-
BS 4449 : 1997	High Yield Deformed Bar G460	0.25	-	-	0.050	0.050	0.51	All Sizes	460	-	1.08	14	5	-	D ≤ 16 = 5D D > 16 = 7D	-
	Plain Bar G250	0.25	-	-	0.060	0.060	0.42	All Sizes	250	-	1.15	22	-	-	2D	-
BS 4449 : 2005 GB500B	High Yield Deformed Bar GB500B	0.22	-	-	0.050	0.050	0.50	10 - 40	500	-	1.08	-	5	-	-	≤ 16 = 4D > 16 = 7D
	High Yield Deformed Bar G500	0.22	0.60	1.70	0.050	0.050	0.50	All Sizes	500	550	1.05	14	2.5	20 - 250	-	32 - 400
SS2 Part 2 : 1999	Plain Bar G300	-	-	-	0.060	0.060	Nil	6 - 20	300	330	1.10	16	-	12.50 - 63	-	-
	High Yield Deformed Bar G500N	0.22	-	-	0.050	0.050	0.44	12 - 36	500 - 650	-	1.08	-	5	D ≥ 20 = 4D	-	D ≤ 16 = 4D
AS/NZS 4671 : 2001	Deformed Bar G250N	0.22	-	-	0.050	0.050	0.43	12 - 36	250	-	1.08	-	5	D ≥ 20 = 4D	-	D ≤ 16 = 4D
	High Yield Deformed Bar G500E	0.22	-	-	0.050	0.050	0.49	6 - 40	500 - 600	-	1.15 - 1.40	-	10	D ≥ 20 = 4D	-	D ≤ 16 = 4D
	Deformed Bar G300E	0.22	-	-	0.050	0.050	0.43	6 - 25	300 - 380	-	1.15 - 1.50	-	15	D ≥ 20 = 4D	-	D ≤ 16 = 4D

Note : CE

$$\text{Carbon Equivalent} = \frac{C}{100} + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

- EL - Elongation
 - GL - Gauge Length
 - SO - Original Cross Sectional Area of Test Piece
 - D - Nominal Size of Bar
 - Ø - Diameter
- Torsid Bar - TORSID Bars are produced from low carbon steel by a special heat treatment process during rolling giving the bar an exceptional combination of strength, toughness, ductility and weldability and has the exact properties of TEMPCORE bars. It complies with all the test requirements of BS 4449 : 1997, BS 4449 : 2005 GB500B, MS 146 : 2006, SS2 PART 1 & 2 : 1999 and AS/NZS 4671 : 2001 pertaining to yield stress, tensile strength, elongation, bending, rebending and weldability.



Hot Rolled Steel Bars / Wire Rods For Machine Structural Use

Standard	Grade	Chemical Composition (%)				
		C	Si	Mn	P	S
JIS G 4051 : 2005	S10C	0.08 - 0.13	0.15 - 0.35	0.30 - 0.60	0.030 Max	0.035 Max
	S15C	0.13 - 0.18				
	S20C	0.18 - 0.23				
	S25C	0.22 - 0.28				
	S35C	0.32 - 0.38				
	S38C	0.35 - 0.41				
	S40C	0.37 - 0.43				
	S45C	0.42 - 0.48				
	S48C	0.45 - 0.51				
	S50C	0.47 - 0.53				
S53C	0.50 - 0.56	0.60 - 0.90	0.030 Max	0.035 Max		
S55C	0.52 - 0.58					

Hot Rolled Steel Bars / Wire Rods For Cold Finished Steel Bar

Standard	Grade	Chemical Composition (%)				
		C	Si	Mn	P	S
JIS G 3108 : 2004	SGD 1	0.1 Max	-	0.30 - 0.60	0.045 Max	0.045 Max
	SGD 1K					
	SGD 2K					
	SGD 3KM					
		0.10 - 0.15	0.20	0.60 - 0.90		
		0.15 - 0.20	0.20			

Hot Rolled Steel Bars / Wire Rods For General Structure

Standard	Grade	Chemical Composition (%)					Tensile Properties				Bend Testing			
		C	Si	Mn	P	S	Min Yield Strength (N/mm ²)	Min Yield Strength (N/mm ²)	Min Elongation (%)	Bend		Rebend		
							245 for ≤ Ø16	400 - 510	20 min for bar Ø ≤ 25mm 22 min for bar Ø > 25mm	Dia of Former	Angle (°)	Min of Former	Angle (°)	
JIS G 3101 : 2004	SS400	-	-	-	0.05 Max	0.05 Max	235 for > Ø16 to 40 215 for > Ø40 to 100							

Weight Table And Sizes For Bars

Norminal Diameter (mm)	16	20	22	25	30	32	34	36	38	40	42	45	48	50
Cross-Sectional Area (mm ²)	201.1	314.2	380.1	490.9	706.9	804.2	907.9	1017.9	1134.1	1256.6	1385.4	1590.4	1809.6	1963.5
Mass Per Meter Run (kg/m)	1.579	2.466	2.984	3.854	5.549	6.313	7.127	7.991	8.903	9.864	10.875	12.485	14.205	15.413
Pieces Per Bundle (6m)	108	68	56	44	32	28	24	22	20	18	16	14	12	12
Norminal Weight Per Bundle (MT)	1.023	1.006	1.003	1.017	1.065	1.061	1.026	1.055	1.068	1.066	1.044	1.049	1.023	1.110
Deviation Over and Under The Norminal Mass Per Meter Run (%)	±4.0%													
	±3.5%													

Note : The nominal mass per meter run not applicable to JIS G 4051 : 1979