



# Demand and Supply Trend of Steel Raw Material and Wire in Vietnam's Fastener Industry

## Foreword

In recent years, Vietnam has maintained a very impressive growth rate. Even in 2020, the worst year of the epidemic, due to corporate supply chains moving out of China against the backdrop of the US-China trade war, it still maintained a 2.91% growth and was one of the major economies in addition to Taiwan that still maintained positive economic growth. As the impact of the epidemic subsided, Vietnam's GDP growth rate in 2022 was around 8.02%, the highest in 12 years. Compared to the ASEAN's average GDP growth of 4-5% in 2022, Vietnam's growth rate was nearly two times higher. Although Vietnam's GDP per capita is still one of the lower GDP growth rates in the ASEAN (only higher than the Philippines, Laos, Cambodia, and Myanmar), its overall trend of growth momentum remains unchanged and continues to support its position as an important ASEAN country. The geopolitical rivalry between the US and China (from the trade wars during the Trump administration to the sanctions and regulations during the Biden administration) has made Vietnam a winner. Many of China's labor-intensive industries have been moving south, and Vietnam, because of its advantages, has often been the best "China plus one" option for many companies. Compared to many competing economies, Vietnam has signed numerous trade agreements with various countries/regions in just over 10 years after joining the WTO in 2007 and the signing of free trade agreements such as the Vietnam-EU EVFTA has also shown Vietnam's ambitions beyond the regional economy. For the fastener industry, with geopolitical considerations

and related industries to move as an inevitable trend, which is relatively low-margin labor-intensive fastener industry, moving into Vietnam is a very important advantage. The second advantage is the Vietnamese government's investment in business and infrastructure development. Compared to many competing countries, **the fastener industry's logistics benefited by Vietnam's infrastructure are gradually improved.**

Before the epidemic in 2020, Taiwanese fastener industry gradually developed in Vietnam, forming different types of fastener industry clusters in North, Central, and South Vietnam. In North Vietnam are mostly fastener clusters for automobile/ motorcycle, electrical appliances, communications electronics, ships, and electronics fasteners are one of the main product categories supplied; in addition, Vietnam promotes the automobile and motorcycle manufacturers to set up large factories. Thus far, there are about 50 automobile assembly factories in Vietnam. In addition to the Mercedes-Benz and Isuzu setting up factories in Ho Chi Minh City, most of others in the province are located in Vinh Phuc (Vinh Phu), Quang Ninh, Hai Phong Province, and the northern region of the Province of Binh Ninh. Honda and Yamaha Motors have long been manufacturing in the vicinity of Hanoi, North Vietnam. The Italian Piaggio plant is located in Vinh Phuoc province. The market demand for automobile and motorcycle fasteners forms the automobile and motorcycle fastener supply clusters. It mainly consists of Hanoi City as the supply center and the surrounding fastener manufacturing factories in the provinces of Bac Ninh, Phu Thuy, Bac Giang, Hai Duong, Thanh An, and Taiping. Formosa Ha Tinh Steel is a major supplier of cold-heading steel wire and rod to the fastener industry. Hai Phong Port and Quang Ninh's Gai Nei Port are the two major ports in North Vietnam. Laixian International Gateway Port in Hai Phong is the first deep-water port in the region and started operation in 2018. With a water depth of 14 meters and a mooring area of 750



meters, Laixian Port can reliably berth large container ships of up to 100,000 DWT. The new deep-water port, equipped with comprehensive infrastructure and loading/unloading technology, will increase Hai Phong Port's throughput to 30 million metric tons per year and reduce the time required for shipping to Europe from 30 to 23 days, to the east coast of the U.S. from 35 to 27-30 days, and to the west coast of the U.S. from 20 to 13-15 days, representing an advantage for seaborne transportation in the region. For steel that cannot be supplied by Formosa Ha Tinh Steel, it can be directly imported by sea transportation. Da Nang is the largest port in central Vietnam. Da Nang is located at the west coast of Han River estuary in the central coast of Vietnam, on the south side of Da Nang Bay, which is the end of the East-West Economic Corridor and the largest seafood export port in Vietnam. However; **there is no obvious fastener industry cluster in central Vietnam, therefore, the demand for steel wire and rod is mainly for infrastructural use, such as rebar, spot welded wire mesh, bamboo welded wire mesh.**

In the early days, South Vietnam's fastener cluster mainly supplied fasteners to meet the demand of local woodworking industry and daily DIY use. Later, Taiwanese companies and non-Taiwanese companies set up export-oriented fastener factories in Vietnam. In addition to Mercedes-Benz and Isuzu Automobile setting up factories in Ho Chi Minh City, Taiwan's Sanyang Motor and Kwang Yang Motor have also brought dozens of motor-related associates from Taiwan to Vietnam. Industries in the region have formed clusters, mainly in Binh Duong and Dong Nai provinces that form a supply chain area,

with Binh Duong province gradually becoming the center of the fastener manufacturing industry. **Considering the development of business, trade and transportation needs, the region has been expanded to Long An Province, Can Tho City, and recently to Tay Ninh Province.** The Port of Ho Chi Minh (Saigon Port) was once the most important distribution center for steel wire and rod in South Vietnam. Due to urban planning, the Port of Saigon will be relocated to Ba Di Tau Ton Province, 80 kilometers northeast of Ho Chi Minh City. Tau Ton Port is located in the south of Ho Chi Minh City and is the outer port of Ho Chi Minh City. With only 1-2 hours drive away from South Vietnam's traditional fastener industry development area, Binh Duong Province and Dong Nai Province, it has convenient transportation and has successively attracted fastener companies to set up operations. Located in the vicinity of the existing port of Tou-Ton and the new port of Gai Mai Int'l Terminal, it is very convenient for river and sea transportation and companies setting up factories there to operate from the "factory's point of view" to the "perspective of the entire city business", which has been evaluated as the most suitable place for Taiwanese businesses to invest in steel and hardware products in a new world. (Source: Wei Ming Wang, 2020.11, The Development of Vietnamese Fastener Industry and the Impacts of EU-Vietnam FTA, Fastener World Magazine No.185 (Mandarin Version), (Fastener World Inc.), p.62~64 °)

Inland waterway is also one of the main logistics and transportation ways in Vietnam. The development of inland waterway transportation is also a logistics way for steel wire and rod. 4 major inland waterway routes have been formed in North

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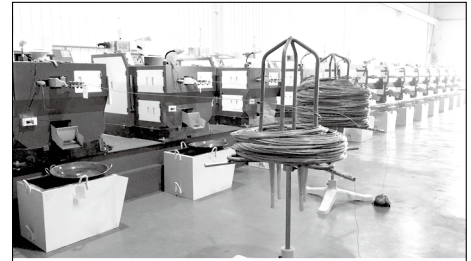


Vietnam; in the central region, rivers are the main transportation routes, but most of them are short-distance routes of less than 100 kilometers in length, and only in the Quang Binh province, there is a port system. The southern region has six waterway transportation routes, of which the Dong Nai River system and the Mekong River system are the two main inland waterway transportation systems in the southern region. The river waterway transportation mainly handles most of the traditional cargoes, which are large in size and low in value and which is also suitable for steel wire and rod shipment, but less suitable for the export of finished fastener containers. However, the breakthrough in the development of Vietnam's coastal shipping routes and fleet has enabled it to participate in the container transportation activities in the southern region, and has also significantly reduced the pressure on the north-south road transportation of the steel wire and rod used for fasteners provided by Formosa Ha Tinh Steel.

## Steel Market Demand and Supply in Vietnam

Iron & steel is a basic industry for national construction and a key industry that must be emphasized for economic development. It is called the "mother of all heavy industries," as it is undoubtedly the foundation of transportation vehicles, machinery, shipbuilding, construction, and electrical machinery, and is highly related to other industries, such as automobiles, electronic components, chassis, machine tools, etc. The Vietnamese government has planned to become a major steel manufacturing country in ASEAN and supported the development of the steel industry. In addition to the establishment of the Vietnam Steel Corporation (VSC), it has also encouraged foreign companies to invest in Vietnam. Foreign investors from Japan, S. Korea, Singapore, and Australia have invested in the establishment of steel plants in Vietnam since around 1990. Driven by foreign investments, Vietnam has developed its own local steel industry, which can be categorized into three main types, including "VSC (a state-owned enterprise) and its direct subsidiaries", "steel plants jointly owned by VSC and foreign investors", and "state-owned steel plants belonging to other state-owned industries and privately-owned steel plants". They mainly produce steel for building materials and downstream products such as coils, rods, welded pipes, colored steel, galvanized steel, cold rolled steel, etc. China has not directly invested in steel plants in Vietnam, but Baosteel has built a blast furnace in Zhanjiang, Guangdong Province, on the border between Vietnam and China; WISCO (in talks with Baosteel for a merger) has invested in a blast furnace in Fangchenggang, Guangxi Province; and through the "ASEAN +1" tariff-free strategy, it has laid out a plan to expand into ASEAN's steel manufacturing industry, which is focused on the production of upstream steel mills' hot-rolled steel products and hot-rolled steel in plate and sheet, and rolled steel products.

Among these foreign investors, Japan, S. Korea and Taiwan play important roles. Japanese companies focus on "end-use products" and "steel raw materials" in the steel industry. For example, Japan's Honda and Yamaha dominate Vietnam's motorbike market and are major users of steel applications. With the national power to promote industrial cooperation with Vietnam, S. Korea's industrial deployment in Vietnam is mainly driven by industry-leading "POSCO" that facilitates "horizontal integration" and localized production. POSCO mainly supplies steel sheet and coil (mostly midstream steel products before end-use applications), such as POSCO-VN cold rolling mill, POSCO-VST stainless steel mill, POSMAC high-corrosion coated steel mill, POSCO-SS-VINA reinforcing bar and profiled steel mill, POSCO-VNPC steel mill for home appliances, and POSCO-VHPC steel mill for automobiles. Taiwanese manufacturers going to Vietnam to set up plants include Formosa Ha Tinh Steel and CSV. Electric furnace plant Tung Ho Steel acquired Vietnam's Fuco Steel Corp in 2016. These companies mainly focus on Vietnam's domestic sales and expect to expand to the ASEAN market and then other areas in the future. In the case of Formosa Ha Tinh Steel, its products include flat steel billets, small steel billets, hot rolled steel sheets and wire & coils, etc., with domestic and export sales each accounting for about half of the total. CSV, a cold rolling mill in Vietnam, mainly produces cold rolled steel, hot-dip galvanized steel, and electromagnetic steel sheets,



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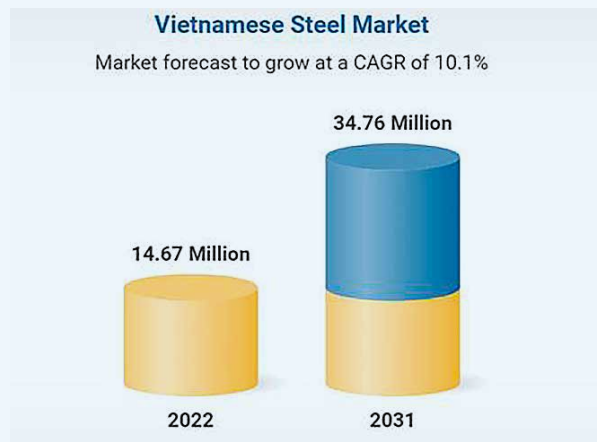
etc. Domestic sales are the mainstay of the mill, supplemented by external sales, with the proportion of domestic sales being around 60%, and the proportion of domestic and external sales being adjusted according to the price. **Taiwan's steel supply in Vietnam is mainly for upstream steel mills and downstream industries, such as steel pipes, fasteners, automobile and motorcycle parts, etc.** Upstream industries are mainly supplied to Vietnam's steel mills. The upstream industry is mainly supplied to the local market in Vietnam for intermediate processing in the midstream industry, and exported to ASEAN countries. For the downstream sector, if there is no suitable subcontracting plant for intermediate processing in the domestic market of Vietnam, or if it is not possible to supply suitable steel for intermediate processing, suitable steel must be imported or purchased directly from steel mills, and then processed in their own intermediate steel production lines or in the midstream industry plants, in order to facilitate the supply of suitable raw materials for the downstream finished products.

Taking the downstream fastener industry as an example, upstream steel mills mainly supply hot rolled wire coils from hot rolling small steel billets. The steel wire & coils required for forged, formed and thread rolled fasteners are the fine-drawn wire & coils featuring complete spheroidization or appropriate heat treatment. The process from hot rolling wire coils to fine-drawing wire & coils is the mid-stream process required for fastener production. At present, most Vietnamese fastener factories aiming at controlling the quality and cost of raw materials use hot rolled wire coils supplied by steel mills having their own production lines to control and adjust rough drawing, fine drawing and heat treatment and supplying wire coils for forged, formed, and thread rolled fasteners. For unavailable alloy steel wire coils or steel types where the production lines are not capable of controlling and adjusting their properties, fastener manufacturers always import wire coils with complete drawing and spheroidizing.

Based on the analysis of Vietnam's steel industry comprising more than 100 companies, of which the larger ones include Formosa Ha Tinh Steel, Hoa Sen, Hoa Phat Group, VSC, SMC Steel, VSC-POSCO (VPS), etc., it reads that the demand and supply of Vietnam's steel market is expected to increase at a CAGR of 10.1% from 14.67 million tons in 2022 to 34.76 million tons in 2031. (Figure 1) According to the World Bank's 2021 statistics, Vietnam imported 5,910,120 kg of steel wire (HS code 732620). In 2021, Vietnam's steel wire in terms of quantity was mostly imported from China through the ASEAN+1 tariff-free framework, followed by Thailand and Indonesia, and there were also some imports from S. Korea, Japan, Australia, Europe, and the U.S. The World Bank statistics for 2021 are shown in Table 1.

In 2017, Vietnam's Prime Minister's Office put forward a draft of the "Master Plan for Steel Production by 2025 for 2035", which started to eliminate low-efficiency projects and move towards high-end products. Although the Vietnamese government has announced some conditions to make the domestic steel market attractive to investors, such as "listing steel as a priority industry for development," "rewarding 100% foreign ownership", "eliminating tariffs within the ASEAN Economic Community", "eliminating AD and countervailing duties imposed by the US on Vietnam's steel products"... all of which have made Vietnam's steel market attractive. Although there are foreign investors entering Vietnam, the production capacity of high-grade steel is insufficient or lacking, and most of the high-grade steel still needs to rely on imports, which also reflects the demand for supply of high-grade wire coils for fastener production in Vietnam.

**Figure 1. Vietnam Steel Market CAGR Analysis and Forecasts**

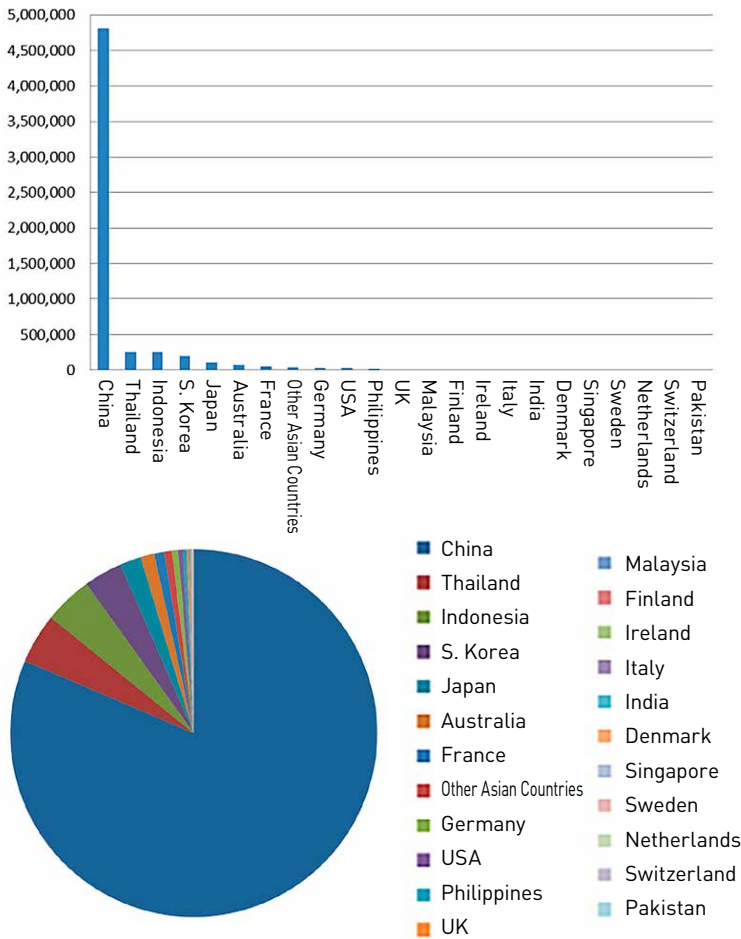


(Source: Research Report on Vietnam's Steel Industry 2022-2031, ResearchAndMarkets.com)

**Table 1. World Bank Statistics on Vietnam's Steel Wire Import in 2021**

Import Origin	Value (1,000 USD)	Amount (KG)
Global	20,868.55	5,910,120
China	16,993.14	4,812,570
Thailand	918.07	260,004
Indonesia	883.27	250,149
S. Korea	709.03	200,803
Japan	391.16	110,780
Australia	249.58	70,684
France	185.11	52,426
Other Asian Countries	142.81	40,445
Germany	111.00	31,436
USA	89.44	25,331
Philippines	63.34	17,937
UK	35.68	10,105
Malaysia	31.14	8,819
Finland	23.08	6,536
Ireland	16.15	4,573
Italy	7.11	2,013
India	6.63	1,878
Denmark	3.64	1,030
Singapore	2.48	702
Sweden	2.33	659
Netherlands	2.26	639
Switzerland	1.13	321
Pakistan	0.96	271

Source: <https://wits.worldbank.org/trade/comtrade/en/country/ALL/year/2021/tradeflow/lxports/partner/WLD/product/732620>



## Steel Wire Rod Supply Chain of Vietnam Fastener Industry

Pickling, wire drawing, annealing and galvanizing are specific processes in the basic steel wire rod industry. Wire rod for fasteners is mainly a wire rod that is selected for the necessary alloying composition before entering the fastener process. In addition, the wire drawing and annealing processes are also subject to stringent specifications for the required quality characteristics. The supply of spheroidized wire is the major demand. Heat treatment is used to spheroidize the carbides in the coils or wires to improve ductility and reduce hardness for subsequent fastener forming process. The hot rolled coils are made of low, medium and high carbon steel or alloy steel, through the process of pickling, wire drawing, spheroidizing and fine drawing, with smooth surface and without coating treatment. The cross-section is rounded, and the scale can be processed later.

Take Taiwan's complete fastener supply chain as an example: upstream steel mills supply hot rolled coils of carbon steel or alloy steel; midstream wire and rod mills are in charge of rough drawing, fine drawing, tempering and spheroidizing, and other heat treatment of hot rolled coils, and downstream fastener manufacturers supply wire rod and coils for cold processing, such as Chun Yu, Quintain Steel, Yieh Hsing, Tycoons, Camellia Metal and so on, which are all professional spheroidized wire rod suppliers or subcontracting OEM factories; downstream factories are mostly for fastener forming and processing, and only a small number of fastener factories have spheroidized wire rod pickling and fine drawing processes, and very few of them do their own drawing, tempering, spheroidizing, or heat treatment. Since the upstream, midstream and

downstream have their own specialized division of labor, downstream fastener manufacturers can quickly obtain the wire coils with required dimensional accuracy and quality, without the problems of delay caused by self-drawing and reducing the quality risk of the wire heat treatment process, and enabling them to focus on product R&D and production.

In terms of the regional development of Vietnam fastener industry, since there was no steel refinery in Vietnam to provide wire and rod in the early days, the wire and rod required by Taiwanese fastener manufacturers in Vietnam were mainly imported from Taiwan to ensure the required dimensional accuracy and quality such as tempering and other heat treatment. In later days, in order to reduce the costs of raw materials and overseas shipments, they gradually purchased hot rolled wire from local refineries and draw and heat treat wire by themselves.

Based on the World Bank's 2021 statistics on Vietnam's trade of steel wire rod and the CAGR of Vietnam's steel market demand and supply, **the total number of hot rolled wire rod supplied to Vietnam's steel market in 2023-2031 should be able to satisfy the actual demand, and Vietnam's own development of its domestic steelmaking industry can also meet the quantity of hot rolled wire rod supplied to satisfy the demand.** However, from the point of view of actual demand, the main types of steel wire for industrial use in Vietnam are wire rod, galvanized steel wire, prestressed steel wire strand, cold drawn steel wire, and annealed steel wire. **(Figure 2)** Although the actual demand for wire rod for fastener manufacturing is mainly annealed cold drawn steel wire, the import statistics do not clearly distinguish the types of steel wire and there is no statistical analysis of the types of carbon steel alloy steel actually demanded. **Based on the analysis of wire rod types Formosa Ha Tinh Steel can provide in 2023 (Table 2), Formosa Ha Tinh Steel's current wire rod products have already obtained JIS, MS (Malaysia), and IS (Indonesia) certificates, and hot rolled coils have demonstrated int'l quality competitiveness.** They can adjust the quantity and size of wire rod according to the market demand. For Vietnam fastener industry, Formosa Ha Tinh Steel is mainly supplying the fastener industry with commercial grade or general cold working grade, while the special cold forging grade SCWQ or heavy cold forging grade HCWQ for fasteners are mainly supplied to meet the demand for carbon and alloy steel categories, which also shows that the fastener industry in Vietnam has met the demand for the supply of the main steel types.

Since the fastener industry in Vietnam lacks large-scale wire tempering, spheroidizing, and heat treating supply chain in the midstream, both existing Vietnamese fastener manufacturers and subsequent fastener manufacturers in Vietnam need to consume more investment costs and management. If there are large-scale wire tempering, spheroidizing, and heat treating suppliers or OEM factories in the supply chain, fastener factories are able to use the wire to produce fasteners, avoiding the risk caused by self wire drawing and heat treatment.

Wire materials that Vietnam fastener industry needs, whether imported or obtained from Formosa Ha Tinh Steel, are mainly supplied based on the supply chain



**Figure 2. Major Steel Wire Types in Vietnam**

[Source: <https://camasteel.com/steel-wire>]



Wire rod  $\Phi \approx 5\text{mm} \sim 42\text{mm}$   
(alloy or non-alloy)



Galvanized  
steel wire  
 $\Phi \approx 8 \text{ mm Max}$



Cold drawn steel wire  
 $\Phi \approx 1\text{mm} \sim 20\text{mm}$   
(alloy or non-alloy)



Annealed steel wire  
(hot rolled or cold drawn)



Pre-stressed steel wire strand (alloy or non-alloy)

efficiency and convenient shipment from the upstream. Although the areas around Ho Chi Minh City and the Vietnamese fastener clusters, such as Binh Duong and Long An, are developing rapidly, it is difficult to solve the risk of bottlenecks in the fastener wire material supply chain unless the government of Vietnam has appropriate solutions to alleviate the congestion of the transportation traffic or unless the clusters of fasteners transform or integrate on their own to form a large-scale midstream supply chain for fasteners. The areas around the Hoa Binh Steel Industrial Zone and the fastener clusters in Vietnam, such as Ba Dai Tau Ton, Dong Nai, and etc., can all be suitable areas for a sizable midstream supply chain of fasteners from the viewpoint of the trend of supply chain analysis. Despite the worsening global inflation, the supply of Vietnam's steel market from 2023 to 2031 is not yet in short supply, as Formosa Ha Tinh Steel and other steel mills are cooperating with the Vietnamese government to develop high-grade steel production or are still importing high-grade steel to meet the market demand. However, for Vietnam's fastener industry, the midstream supply chain will affect the final fastener production and the overall logistics bottleneck, which is still a hidden problem in Vietnam's fastener steel raw material supply chain, and whether or not it will cause a substantial obstacle in the future will be a new issue for Vietnam's fastener material demand and supply.

**Table 2. Types of Wire & Rod that Formosa Ha Tinh Steel Puts into Mass Production in 2023**

Grade	Standard	Type
MQ Commercial quality	SAE J403	1006、1008、1010、1012、 1015、1017、1018、1022
	JIS G3505 TIS 348-2540	SWRM6、8、10、12、15、 17、20、22
	MS ISO 16120	C4D、C7D、C9D、C10D、 C12D、C15D、C18D、C20D
	TCCS 46:2020/ FHS	1030K
GCWQ (CHQ) General Cold Processing Quality Grade / Cold Forging Head Quality Grade	SAE J403	1008、1022、10B21、 10B21-M、10B33、10B33- SH、10B33Cr-SH
	JIS G3507-1	SWRCH6A、8A、10A、12A、 15A、18A、22A
	MS 1795:2005	SWRCH6A、8A、10A、15A、 18A、22A
GCWA	TCCS 38:2019/ FHS	50BV30、51B20-M、 51B20-SH
GHWQ	JIS G 3506	SWRH42A、52A、57A、67A SWRH72A
PQ HCWQ	JIS G4051	S45C, SCM 435, 51B20
WQ	JIS G3503	SWRY11
	AWS A5.17	EM12K
WA	AWS A5.18M	ER70S-3、ER70S-6、 YGW11、YGW12、4Si1
MA	TCCS 54:2021/ FHS	1030Cr、1033Cr、1035Cr
	GB/T 24587	30MnSi

Note: Hot rolled wire dia.  $\Phi 5.5 \sim 19\text{mm}$ ;  
hot rolled rod dia.  $\Phi 20 \sim 28, 30, 32\text{mm}$

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