美國材料試驗協會(ASTM)

Japanese Industrial Standards (JIS) is the most important and authoritative national standards system in Japan, covering almost all industrial and industrial fields, and is developed and scrutinized by the Japan Industrial Standards Committee (JISC).

JIS Subject Area and Classification

Japanese Industrial Standards (JIS) standard classification of a total of 18 categories of the main theme of the main areas, and the English letters of the distinction, in which the “steel materials” specification is listed in the “G category”, all the way to GXXXX way of coding, for example:
G4051 (Carbon Steel for Mechanical Structures), G3507-1 (Carbon Steel for Cold Punching), etc. The English codes and numbers are used to categorize the steel grades.

JIS standard development process

① Any individual or organization may submit a draft JIS standard to the competent authority.

② The draft shall be published for comments and reviewed by JISC and the Technical Committee for appropriateness and reasonableness.

③ After the competent authority's interest avoidance review and announcement, the draft will be formally formulated and published in the government bulletin.

JIS Certification and the JIS MARK Mark System

The JIS MARK Mark is the symbol of JIS certified products. Since 1949, the JIS MARK system has been implemented in parallel with the Industrial Standardization Law, and has been revised several times to conform to international standards (e.g., incorporation into ISO/IEC GUIDE 65, etc.).

The major amendments include:

- Enhancing the impartiality of the JIS MARK by having it performed by a private third-party organization.
- Expanding the scope of products and companies that can apply for JIS MARK, including manufacturing, processing, import/export and sales.
- Allow self-declaration of product compliance with JIS specifications (but not JIS MARK labeling).

Steel Symbol Indication–JIS

Basic Structure

front	middle	back	Additional
①	②	③	④

① Substance: Expressed in English letters. Example:

S: Steel – denotes steel material
F: Ferrum – the Latin name for iron
A: Aluminium – represents aluminum
M: Magnesium – represents magnesium
Pb: Lead – stands for lead

② Codes for the shape, type, and application of products are indicated using English letters or letter combinations.
For example:

C: Casting
K: Tool
NC: Nickel-Chromium
SC: Steel Casting
US: Stainless Steel
UH: Heat-Resistant Steel
FC: Gray Cast Iron
SKS: Alloy Tool Steel
SUJ: High-Carbon Chromium Bearing Steel
SUP: Spring Steel
SNCM: Nickel-Chromium-Molybdenum Steel

Steel Symbol Indication–JIS

③ Type Code:

Usually indicated by numbers to specify material grade, classification number, or minimum strength. For example:

- SS400: Indicates a carbon structural steel with a minimum tensile strength of 400 MPa.
- S45C: Indicates a carbon steel with approximately 0.45% carbon content.
- SM490A: The number 490 refers to the minimum yield strength of 490 MPa.

④ Manufacturing Method or Heat Treatment:

Letters or numbers are added as suffixes to represent the processing method or heat treatment condition. For example:

- A: Annealed
- K: Killed Steel
- R: Rimmed Steel

Steel Symbol Indication–JIS

Basic Structure

◆ General Structural Steel

For example: **JIS G 31 01 SS400**

JIS = Japanese Industrial Standard
G = Denotes the material category: “Steel materials”
31 = Classification code; "31" = Carbon steel
01 = Serial number
1st letter S = Steel
2nd letter S = Structure (indicates intended use)
400 = Minimum tensile strength specification = 400 N/mm²

◆ Carbon Steel for Machine Structural Use

For example: **JIS G 4051 S50C**

4051 = The specific number of the standard, representing the JIS standard for “Carbon Steel for Machine Structural Use.” Covers the grades, chemical compositions, and performance specifications of carbon steels used in mechanical structures.
S = Steel
50 = Indicates a carbon content of approximately 0.50%
C = Stands for “Carbon,” indicating that the steel belongs to the carbon steel category.

Steel Symbol Indication–JIS

◆ Carbon Steel for Machine Structural Use

For example: **JIS G 4052 SNCM220 H**

S = Steel
N = Nickel
C = Chromium
M = Molybdenum
220 = Grade indicating the level of main alloying elements
H = Hardenability; indicates that this steel is intended for heat treatment (suitable for quenching and tempering)

◆ Low-Alloy Steel for Machine Structural Use

For example: **JIS G 4053 SCM435**

S = Steel
N = Nickel
C = Chromium
M = Molybdenum
435 = Indicates alloying and carbon content
4 = General code for chromium alloy steel
35 = Indicates a carbon content of approximately 0.35%

Other Steel Grades:

SMn: High manganese + chromium alloy steel
SCr: Chromium alloy steel
SNc: Nickel-chromium alloy steel
SNCM: Nickel-chromium-molybdenum alloy steel
SACM: Nickel-chromium-molybdenum alloy steel with aluminum content requirement (Al: 0.70–1.20%)

Steel Symbol Indication–JIS

◆ High-Speed Tool Steel

For example: **JIS G 4403 SKH5**

S = Steel
K = “Kougu” (tool in Japanese Romaji); denotes tool steel
H = High-speed (indicates high-speed steel)
S = Grade number used to differentiate high-speed tool steels by composition and performance,
e.g., SKH2, SKH4, SKH51, etc., each number corresponds to different alloy content and properties.

※Supplement:

K = Carbon tool steel	KT = Forging tool steel
KS = Alloy tool steel	KH = High-speed tool steel
KD = Alloy mold steel	

◆ Stainless Steel

For example: **JIS G 4308-2013 SUS316**

4308-2013 = Standard number and year of publication.
JIS G 4308-2013 specifically defines “Stainless Steel Wire Rods,” covering the chemical composition, mechanical properties, and test methods for stainless steel wire materials.
SUS = Prefix used in the Japanese Industrial Standard (JIS) for stainless steel grades, standing for “Steel Use Stainless.”
316 = Grade number indicating an austenitic stainless steel.
※SUS refers to stainless steel, while SCH refers to heat-resistant steel.

Steel Symbol Indication–JIS

◆ Ductile Cast Iron

For example: **JIS G 5502-2022 FCD800-2**

F = Foundry (casting material)
C = Ductile Cast Iron (also known as nodular cast iron)
D = Ductile graphite, emphasizing the spherical shape of the graphite
800 = Indicates a minimum tensile strength of approximately 800 MPa; the higher the number, the greater the strength

※Supplement:
FC = Gray Cast Iron
FCD = Ductile Cast Iron
FCMB = Malleable Cast Iron, Black Core Type
FCMW = Malleable Cast Iron, White Core Type
FCMP = Pearlitic Malleable Cast Iron

◆ General Corrosion-Resistant Cast Steel

For example: **JIS G 5111-1991 SCMnM3**

S = Steel
C = Cast
Mn = Manganese; indicates a manganese-based low alloy steel
M = Medium (medium strength) or "Modified," used to differentiate performance grades
3 = Grade number; the higher the number, the higher the strength level