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Hot-Rolled Steel Sheets and Coils

Steel
Sheet

Preface

Utilizing our excellent manufacturing equipment and honored technology, supported by our rich experience and never-ceasing endeavor of development, NIPPON STEEL manufactures a wide range of Hot-Rolled Steel Sheets and Coils in accordance with Japanese Industrial Standards (JIS), the standards of other countries, and our own strict standards.

Our Hot-Rolled Steel Sheets and Coils are applied to a wide range of applications such as, automobiles, electrical appliances, construction materials, containers, and steel pipes, and receive high acclaim from our customers for its excellent quality.

We are committed to meet our customers’ requirements of quality as well as on-time delivery and offer technical consultations and services for applications of our steel products.

We deeply appreciate your continued support and encouragement.

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Features

1 Wide Range of Product Selection

Hot-Rolled Steel Sheets and Coils meeting a variety of standards ranging from mild steels to high-tensile strength steels are available. Variable sizes of cut sheets, coils, and various surface finishes such as black finish, pickled finish and shot-blasted finish can be selected in accordance with your needs.

2 Consistent Quality

Products of consistent quality are manufactured under strict quality control, utilizing excellent equipment and techniques, and drawing on our wealth of experience.

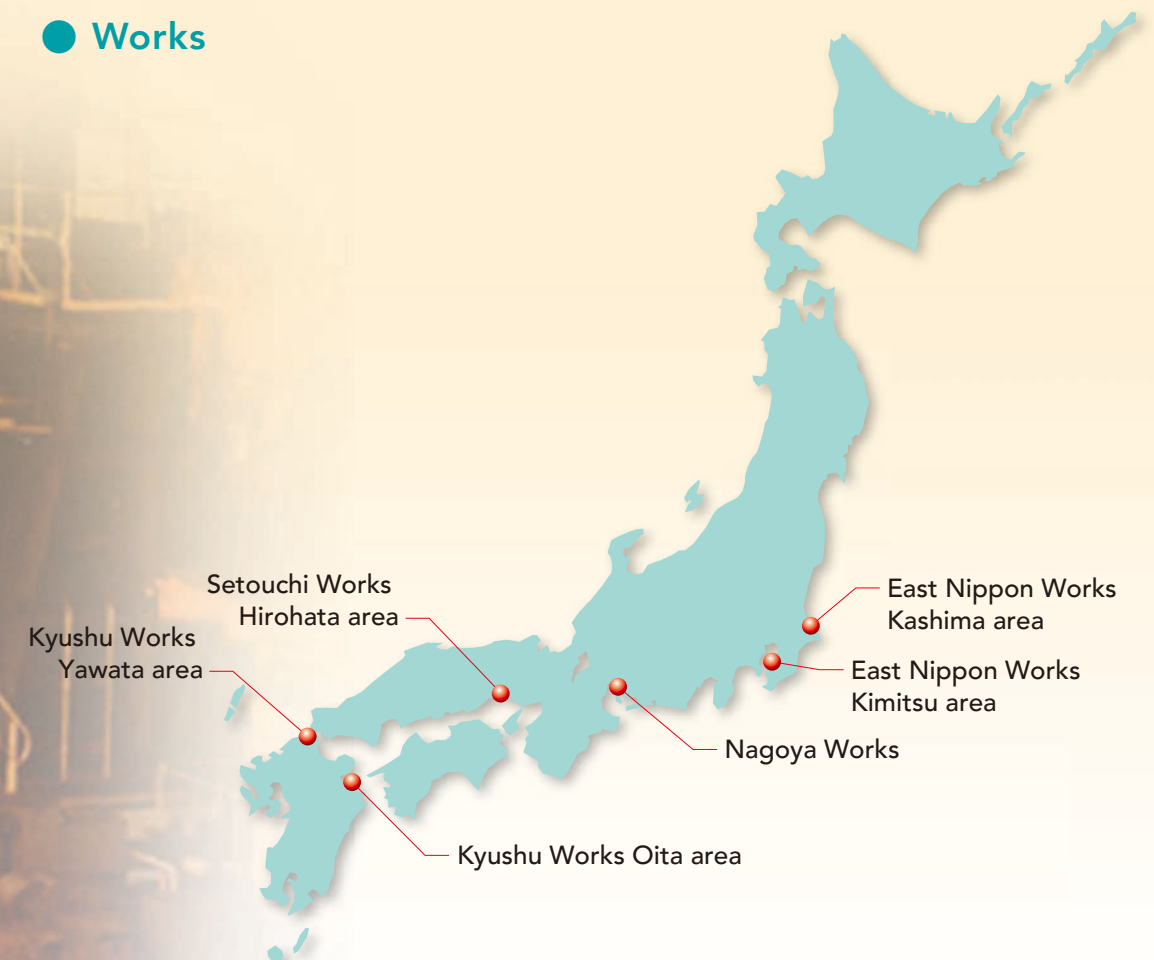
3 Wide Variety of Sizes

Size are available from 1.2 mm to 25.4 mm in thickness and from 600 mm to 2180 mm in width.

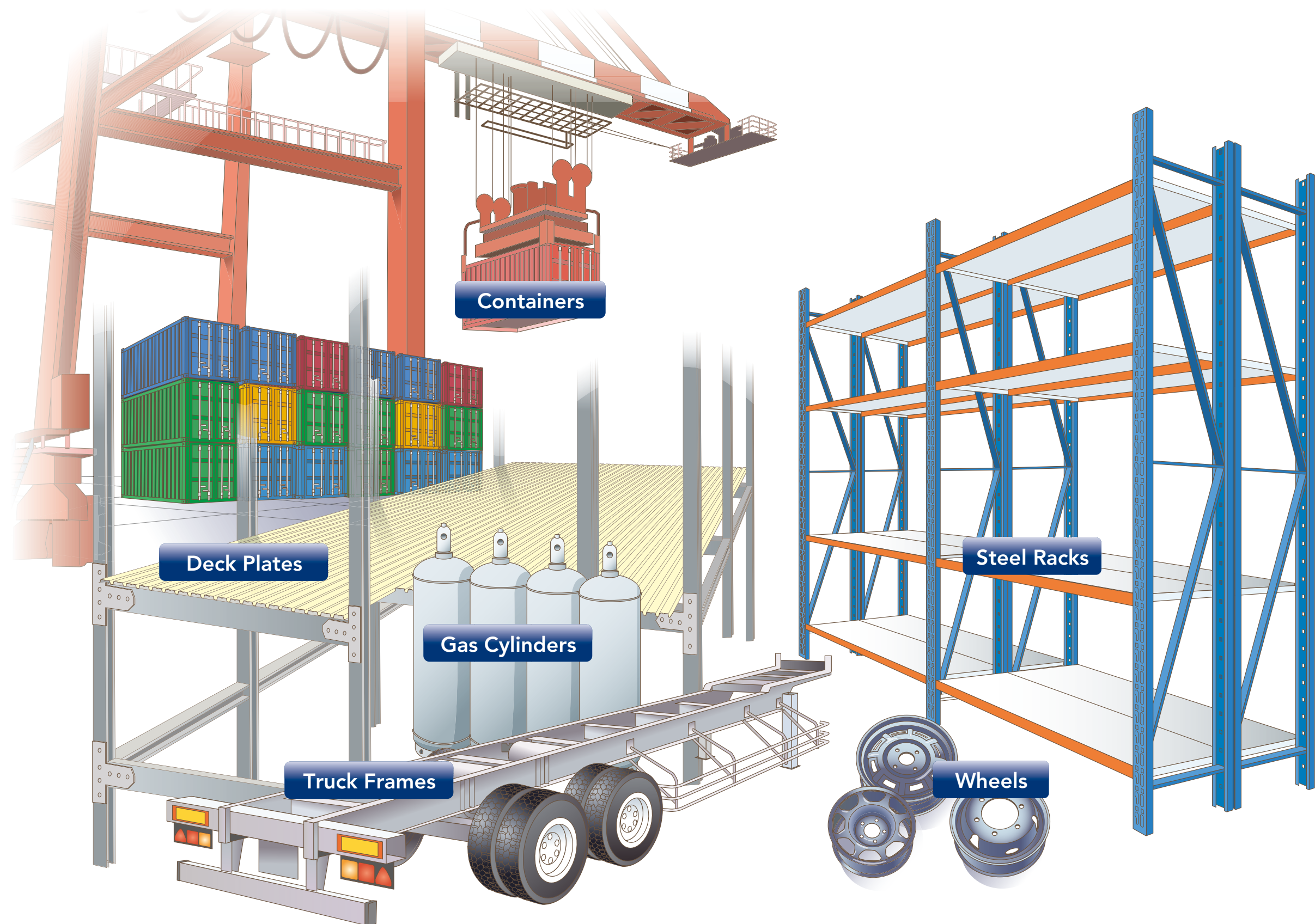
4 Technical Service for Every Need

Consultation services regarding quality characteristics, applications, and processing methods of our products, and more are thoroughly provided by the technical service divisions of the headquarters and local offices.

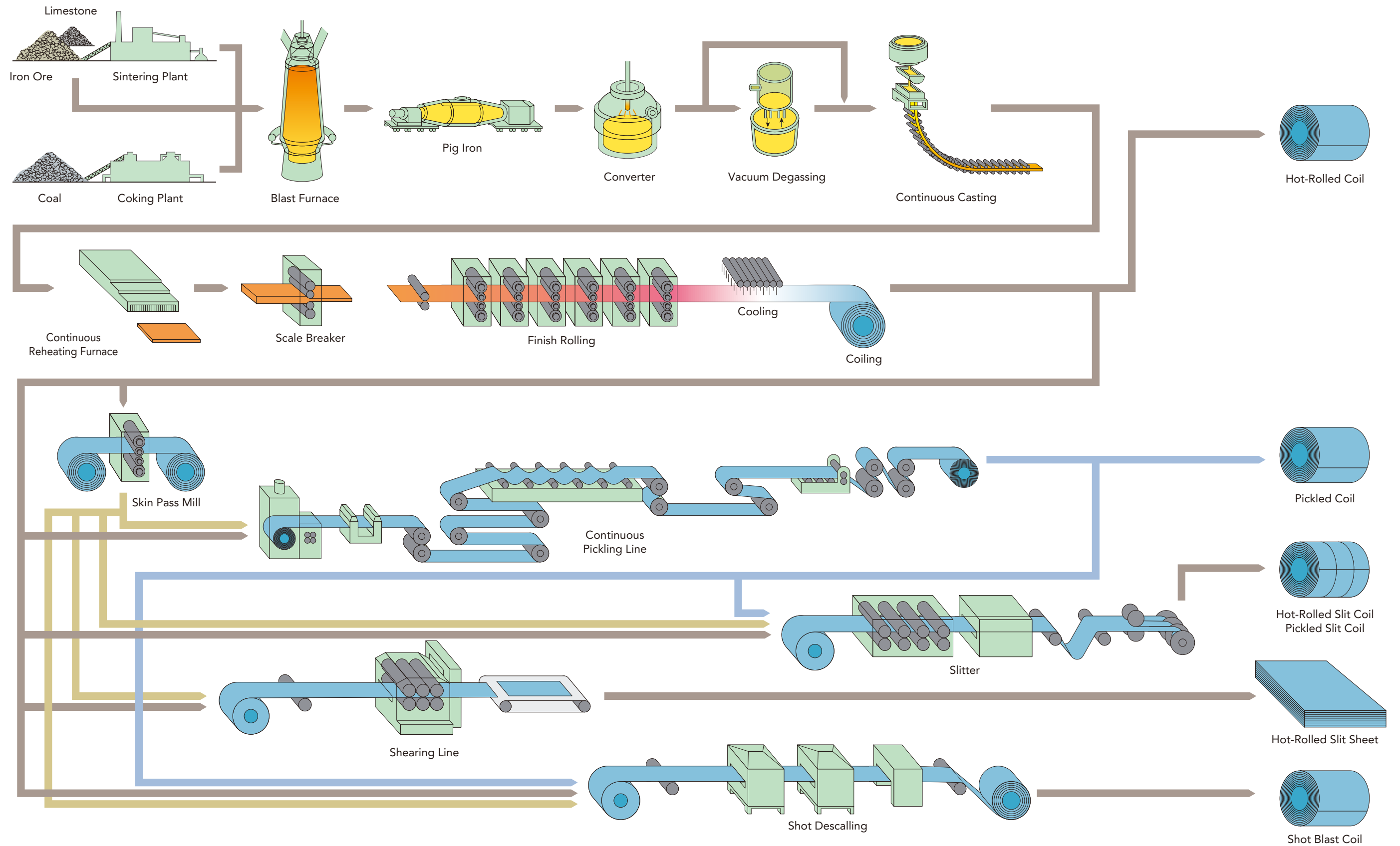
Works



Examples of Use



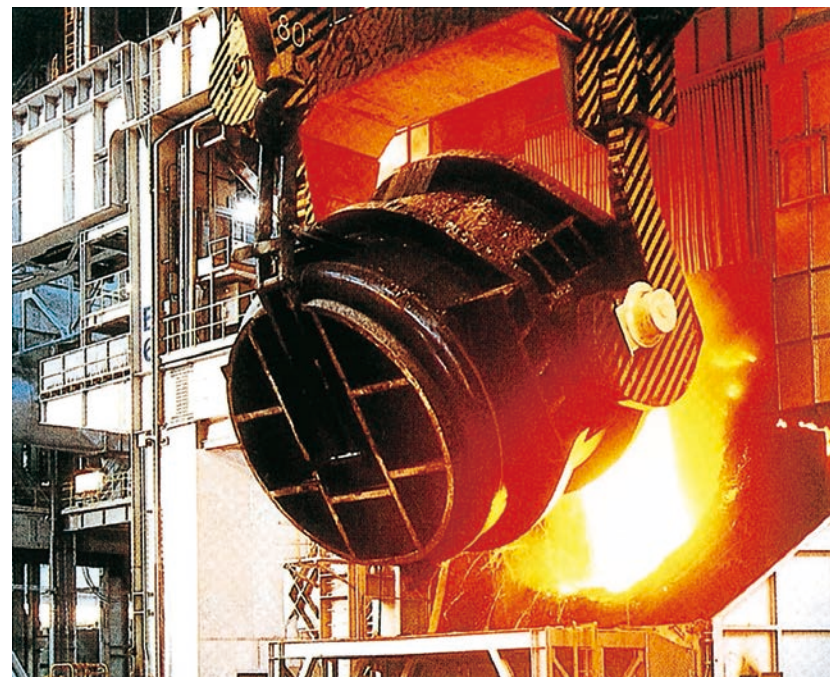
Manufacturing Processes



Manufacturing Equipment

Continuous Casting from the Blast Furnace

Pig iron is formed by a chemical reaction of sinter and coke in the blast furnace. Then, in order to meet our customers' demand for viscosity and robustness, the pig iron goes through four processes: hot metal pretreatment, converter process, secondary refining process, and continuous casting to remove excess carbons and impurities for chemical refinement in order to produce an intermediate material known as "slab."



Converter



Continuous Casting



Hot-Rolling

Hot-Rolling

Hot-rolled coil is made by continuously rolling the slab, after heating the slab in the reheating furnace, by the roughing mill and finishing mill, and coiled for a easier transportation.

At the hot-rolling process, strictly controlling the temperature and the roll surface is essential in producing a high productive Hot-Rolled Steel Sheets and Coils, free from surface defects and internal defects. All production line processes, starting from feeding to the reheating furnace to the completion of coiling, are controlled by a computerized system.

Pickling

The hot-rolled coil passes through the pickling line, where surface scales (iron oxide layer) are removed from the surface of the coil to give an (attractive) surface finish to the steel.

In the pickling line, surface scales are removed with hydrochloric acid, and the coil is completely washed and dried before antirust oils are applied.



Pickling

Products

JIS (Japanese Industrial Standards)

| Types | Standards | T.S. (N/mm ²) |
|--|-----------|---------------------------|
| JIS G 3101 Hot-Rolled Steel Sheets and Coils for General Structures | SS330 | 330 – 430 |
| | SS400 | 400 – 510 |
| | SS490 | 490 – 610 |
| | SS540 | 540 ≦ |
| JIS G 3106 Hot-Rolled Steel Sheets and Coils for Welded Structures | SM400A | 400 – 510 |
| | SM400B | 400 – 510 |
| | SM400C | 400 – 510 |
| | SM490A | 490 – 610 |
| | SM490B | 490 – 610 |
| | SM490C | 490 – 610 |
| | SM490YA | 490 – 610 |
| | SM490YB | 490 – 610 |
| | SM520B | 520 – 640 |
| | SM520C | 520 – 640 |
| JIS G 3113 Hot-Rolled Steel Sheets and Coils for Automobile Structural Uses | SM570 | 570 – 720 |
| | SAPH310 | 310 ≦ |
| | SAPH370 | 370 ≦ |
| | SAPH400 | 400 ≦ |
| | SAPH440 | 440 ≦ |

| Types | Standards | T.S. (N/mm ²) |
|--|-----------|---------------------------|
| JIS G 3125 Corrosion Resistant Rolled Steel Sheets and Coils | SPA-H | 490 ≦ |
| JIS G 3116 Hot-Rolled Steel Sheets and Coils for Gas Cylinders | SG255 | 400 ≦ |
| | SG295 | 440 ≦ |
| | SG325 | 490 ≦ |
| | SG365 | 540 ≦ |
| JIS G 3131 Hot-Rolled Mild Steel Sheets and Coils | SPHC | 270 ≦ |
| | SPHD | 270 ≦ |
| | SPHE | 270 ≦ |
| | SPHF | 270 ≦ |
| JIS G 3132 Hot-Rolled Carbon Steel Sheets and Coils for Pipes and Tubes | SPHT1 | 270 ≦ |
| | SPHT2 | 340 ≦ |
| | SPHT3 | 410 ≦ |
| | SPHT4 | 490 ≦ |

NIPPON STEEL Standards

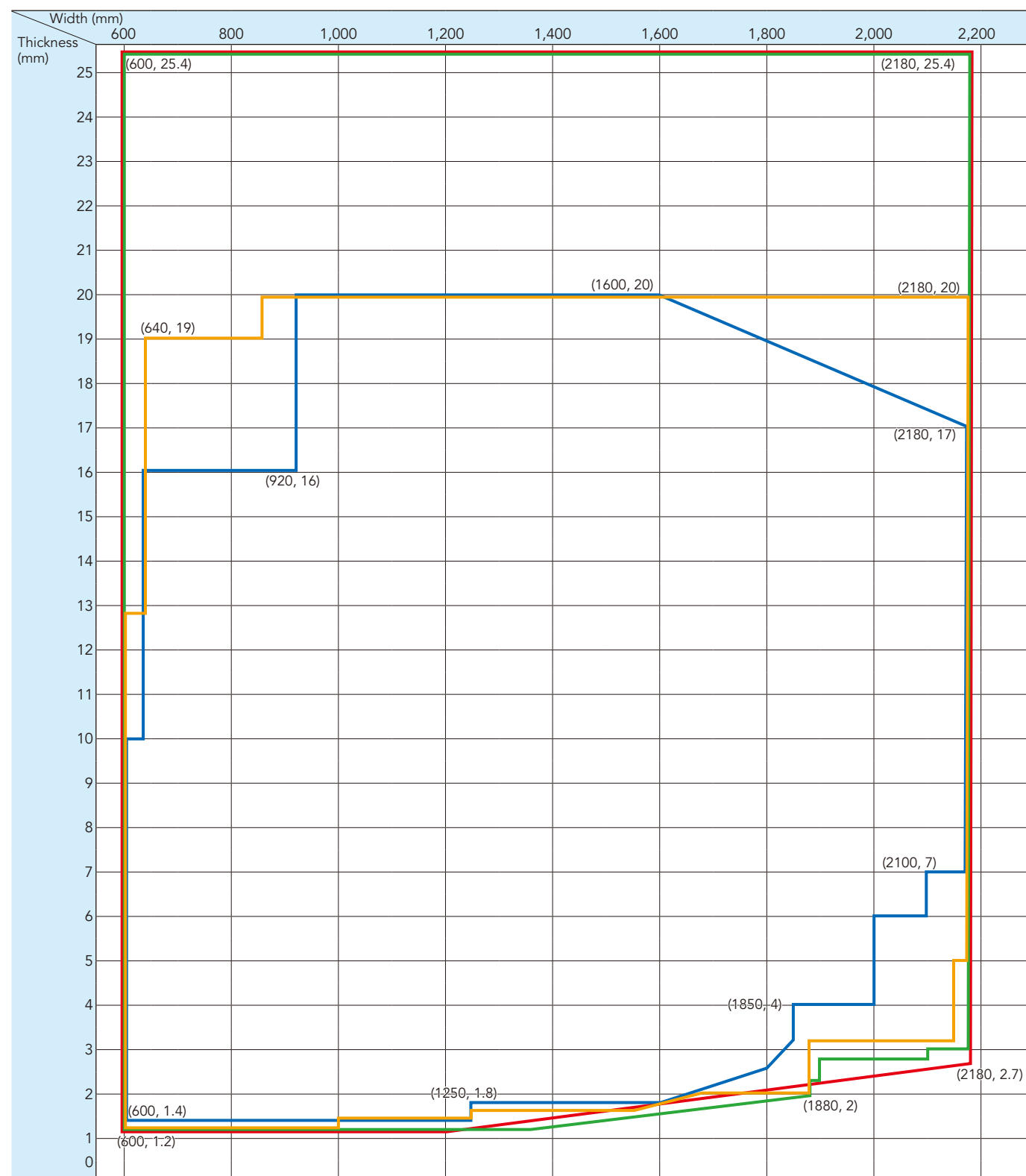
| Types | Standards | Features | Examples of Use |
|---|--|---|--|
| High-Strength Hot-Rolled Steel Sheets and Coils with Automobile Formability | NSHA490 NSHA540 NSHA590 NSHA690 NSHA780 NSHA980 | They can be used for a wide range of applications, from general forming to drawing. | Automobile members, wheel rims |
| Dual Phase High-Strength Hot-Rolled Steel Sheets and Coils with Automobile Formability | NSHA540D NSHA590D NSHA590DH NSHA690D NSHA780D | They are well suited for drawing because of their low yield ratio. They have also excellent fatigue strength. | Wheel discs |
| High-Hole Expanding High-Strength Hot-Rolled Steel Sheets and Coils with Automobile Formability | NSHA370B, NSHA540B NSHA400B, NSHA590B NSHA440B, NSHA690B NSHA490B, NSHA780B NSHA980B | They can be used for a wide range of applications, from general forming to drawing and have superior burring property. | Suspensions, links, arms |
| High-Retained Austenite High-Strength Hot-Rolled Steel Sheets and Coils | NSHA590T NSHA690T NSHA780T | Exceeding the limits of conventional High-Strength Hot-Rolled Steel Sheets for automobiles, they have strength and formability comparable to high-strength cold-rolled steel sheets. | Automobile structural components, suspensions, components with high performance formability of any shape |
| Flooring Sheets and Coils | NFP NFP400 | With maximum anti-slip properties, they drain quickly, and are thin-gauge and light in weight, so they can be used economically for various purposes. | Steps of a car body, passageways, steps, and panels of buildings and structures |
| Longitudinally Striped Steel Sheets and Coils | NFPA1 NFPA2 NFPB1 | They can be used as highly economical strength components resistant against bending and as exterior components for their fine design. | Steps of a car body, factory floors, steel furniture, warehouse racks, steps. |
| Atmospheric Corrosion-Resistant Steel Sheets and Coils | NAW400 NAW490 COR-TEN O | They have high weatherability and can be used unpainted. They also have good wear resistance. | Pillars of marine containers, rail vehicle bodies, exterior construction members |
| Weldable High-Strength Steel Sheets and Coils | WEL-TEN™540 WEL-TEN 590RE WEL-TEN 690RE WEL-TEN 780RE WEL-TEN 950RE | They are low-carbon and low-alloy steel sheets with high strength and superior notch toughness. Also they have high weldability and demonstrate sufficient joint performance. | Industrial equipment, construction machinery |
| Sulfur Dew-Point Corrosion-Resistant Steel Sheets and Coils | S-TEN™1 S-TEN 2 | Developed as steels resistant against sulfuric-acid dew-point corrosion, they are suitable for use in sulfuric-acid dew-point corroding environments where ordinary and stainless steels cannot normally be used. | Casing and ducts of dust collectors, internal cylinders |

NOTE: COR-TEN is a registered trademark of United States Steel Corporation used under license by NIPPON STEEL.

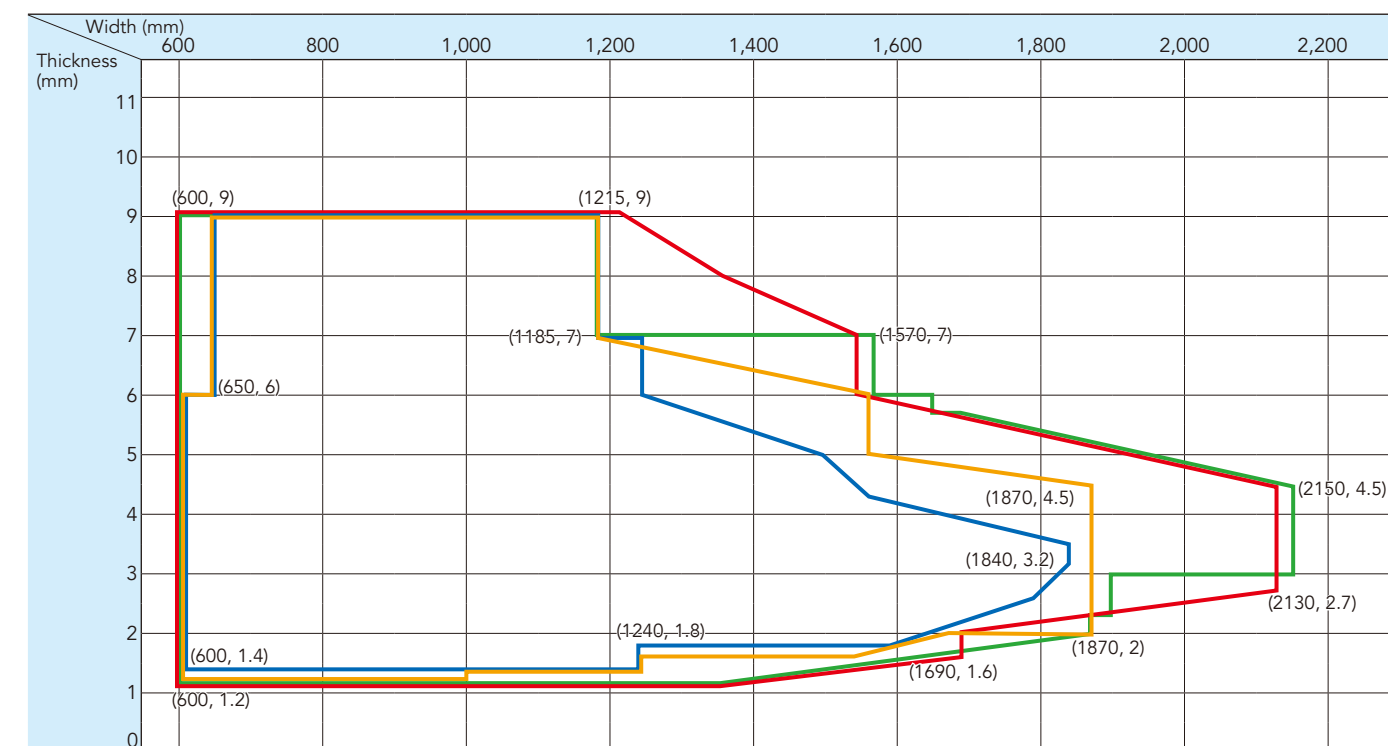
Product Size Ranges

As the available range of production varies depending on standards and applications, please consult us.
Contact NIPPON STEEL if your choice is not available, and we will do what we can to meet your needs.

1. Hot-Rolled Coil (mill edge)



2. Pickled Coil



Remarks: 1. Contact NIPPON STEEL about the varieties of steel strip (slit coil) dimensions available.
2. Contact NIPPON STEEL about the varieties of steel plates (cut sheets) available.

- 270 N/mm² class
- 400 N/mm² class
- 490 N/mm² class
- 590 N/mm² class

Examples of Standards — Chemical Compositions and Mechanical Properties

JIS G 3131

● Hot-Rolled Mild Steel Sheets and Coils

| Designation | Chemical Composition (%) | | | | Tensile Test | | | | | | | | Bending Test | | | | |
|-------------|--------------------------|--------|---------|---------|--|---------------------------------|---------------------------------|--|---------------------------------|---------------------------------|---------------------------------|---------------------------|---------------------------|---------------|---------------------------|---------------------------|---------------------------|
| | | | | | Tensile Strength (N/mm ²) | Elongation (%) | | | | | | | Test Piece | Bending Angle | Inner Diameter | | Test Piece |
| | C | Mn | P | S | | Thickness (mm) 1.2 ≤ t < 1.6 | Thickness (mm) 1.6 ≤ t < 2.0 | | Thickness (mm) 2.0 ≤ t < 2.5 | Thickness (mm) 2.5 ≤ t < 3.2 | Thickness (mm) 3.2 ≤ t < 4.0 | Thickness (mm) 4.0 ≤ t | | | Thickness (mm) t < 3.2 | Thickness (mm) 3.2 ≤ t | |
| SPHC | ≤ 0.12 | ≤ 0.60 | ≤ 0.045 | ≤ 0.035 | 270 ≤ | 27 ≤ | 29 ≤ | | 29 ≤ | 29 ≤ | 31 ≤ | 31 ≤ | No.5 rolling direction | 180° | Close overlap | 0.5t | No.3 rolling direction |
| SPHD | ≤ 0.10 | ≤ 0.45 | ≤ 0.035 | ≤ 0.035 | 270 ≤ | 30 ≤ | 32 ≤ | | 33 ≤ | 35 ≤ | 37 ≤ | 39 ≤ | | — | — | — | |
| SPHE | ≤ 0.08 | ≤ 0.40 | ≤ 0.030 | ≤ 0.030 | 270 ≤ | 32 ≤ | 34 ≤ | | 35 ≤ | 37 ≤ | 39 ≤ | 41 ≤ | | — | — | — | |
| SPHF | ≤ 0.08 | ≤ 0.35 | ≤ 0.025 | ≤ 0.025 | 270 ≤ | 37 ≤ | 38 ≤ | | 39 ≤ | 39 ≤ | 40 ≤ | 42 ≤ | | — | — | — | |

Remarks: 1. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
2. We will carry out a bending test at the customer's request.

JIS G 3132

● Hot-Rolled Carbon Steel Sheets and Coils for Pipes and Tubes

| Designation | Chemical Composition (%) | | | | | Tensile Test | | | | | | | Bending Test | | | |
|-------------|--------------------------|--------|-------------|---------|---------|--|---------------------------------|---------------------------------|--|---------------------------------|--------------------------------|---------------------------|---------------|---------------------------|--------------------------------|---------------------------|
| | | | | | | Tensile Strength (N/mm ²) | Elongation (%) | | | | | Test Piece | Bending Angle | Inner Diameter | | Test Piece |
| | C | Si* | Mn | P | S | | Thickness (mm) 1.2 ≤ t < 1.6 | Thickness (mm) 1.6 ≤ t < 2.0 | | Thickness (mm) 3.0 ≤ t < 6.0 | Thickness (mm) 6.0 ≤ t ≤ 13 | | | Thickness (mm) t ≤ 3.0 | Thickness (mm) 3.0 < t ≤ 13 | |
| SPHT 1 | ≤ 0.10 | ≤ 0.35 | ≤ 0.50 | ≤ 0.040 | ≤ 0.040 | 270 ≤ | 30 ≤ | 32 ≤ | | 35 ≤ | 37 ≤ | No.5 rolling direction | 180° | Close overlap | 0.5t | No.3 rolling direction |
| SPHT 2 | ≤ 0.18 | ≤ 0.35 | ≤ 0.60 | ≤ 0.040 | ≤ 0.040 | 340 ≤ | 25 ≤ | 27 ≤ | | 30 ≤ | 32 ≤ | | 180° | 1.0t | 1.5t | |
| SPHT 3 | ≤ 0.25 | ≤ 0.35 | 0.30 – 0.90 | ≤ 0.040 | ≤ 0.040 | 410 ≤ | 20 ≤ | 22 ≤ | | 25 ≤ | 27 ≤ | | 180° | 1.5t | 2.0t | |
| SPHT 4 | ≤ 0.30 | ≤ 0.35 | 0.30 – 1.00 | ≤ 0.040 | ≤ 0.040 | 490 ≤ | 15 ≤ | 18 ≤ | | 20 ≤ | 22 ≤ | | 180° | 1.5t | 2.0t | |

Remarks: 1. *When agreed upon between the concerned parties, Si content may be specified to 0.04% or less.
2. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
3. We will carry out a bending test at the customer's request.

JIS G 3101

● Hot-Rolled Steel Sheets and Coils for General Structures

| Designation | Chemical Composition (%) | | | | Tensile Test | | | | | | Bending Test | | |
|-------------|--------------------------|--------|---------|---------|--|--|--|---|------|------------|---------------|----------------|------------|
| | | | | | Yield Point or Yield Strength (N/mm ²) Thickness (mm) t ≤ 16 | Tensile Strength (N/mm ²) | | Elongation | | | Bending Angle | Inner Diameter | Test Piece |
| | C | Mn | P | S | | | | Dimensions of Rolled Steel (mm) | | Test Piece | | Elongation (%) | |
| SS330 | — | — | ≤ 0.050 | ≤ 0.050 | 205 ≤ | 330 – 430 | | Thickness of Rolled Steel and Coil t ≤ 5 | No.5 | 26 ≤ | 180° | 0.5t | No.1 |
| | | | | | | | | Thickness of Rolled Steel and Coil 5 < t ≤ 16 | | No.1A | | | |
| SS400 | — | — | ≤ 0.050 | ≤ 0.050 | 245 ≤ | 400 – 510 | | Thickness of Rolled Steel and Coil t ≤ 5 | No.5 | 21 ≤ | 180° | 1.5t | No.1 |
| | | | | | | | | Thickness of Rolled Steel and Coil 5 < t ≤ 16 | | No.1A | | | |
| SS490 | — | — | ≤ 0.050 | ≤ 0.050 | 285 ≤ | 490 – 610 | | Thickness of Rolled Steel and Coil t ≤ 5 | No.5 | 19 ≤ | 180° | 2.0t | No.1 |
| | | | | | | | | Thickness of Rolled Steel and Coil 5 < t ≤ 16 | | No.1A | | | |
| SS540 | ≤ 0.30 | ≤ 1.60 | ≤ 0.040 | ≤ 0.040 | 400 ≤ | 540 ≤ | | Thickness of Rolled Steel and Coil t ≤ 5 | No.5 | 16 ≤ | 180° | 2.0t | No.1 |
| | | | | | | | | Thickness of Rolled Steel and Coil 5 < t ≤ 16 | | No.1A | | | |

Remarks: 1. Alloying elements other than described above can be added to SS540 according to requirements.
2. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
3. We will carry out a bending test at the customer's request.

Examples of Standards — Chemical Compositions and Mechanical Properties

JIS G 3106

● Hot-Rolled Steel Sheets and Coils for Welded Structures

| Designation | Chemical Composition (%) | | | | | Tensile Test | | | | | | |
|-------------|--------------------------|--------|-------------|---------|---------|--|--|--|--|--|----------------|------|
| | | | | | | Yield Point or Yield Strength (N/mm ²) | | Tensile Strength (N/mm ²) | Elongation (%) | | | |
| | C | Si | Mn | P | S | Steel Sheet Thickness, 16 mm max. | | | Steel Sheet Thickness (mm) | Test Piece | Elongation (%) | |
| SM400A | ≤ 0.23 | — | 2.5×C ≤ | ≤ 0.035 | ≤ 0.035 | 245 ≤ | | 400 – 510 | Thickness of Rolled Steel and Coil t ≤ 5 | No.5 | 23 ≤ | |
| SM400B | ≤ 0.20 | ≤ 0.35 | 0.60 – 1.50 | ≤ 0.035 | ≤ 0.035 | | | | Thickness of Rolled Steel and Coil 5 < t ≤ 16 | No.1A | 18 ≤ | |
| SM400C | ≤ 0.18 | ≤ 0.35 | 0.60 – 1.50 | ≤ 0.035 | ≤ 0.035 | | | 490 – 610 | Thickness of Rolled Steel and Coil t ≤ 5 | No.5 | 22 ≤ | |
| SM490A | ≤ 0.20 | ≤ 0.55 | ≤ 1.65 | ≤ 0.035 | ≤ 0.035 | Thickness of Rolled Steel and Coil 5 < t ≤ 16 | | | No.1A | 17 ≤ | | |
| SM490B | ≤ 0.18 | ≤ 0.55 | ≤ 1.65 | ≤ 0.035 | ≤ 0.035 | 365 ≤ | | 490 – 610 | Thickness of Rolled Steel and Coil t ≤ 5 | No.5 | 19 ≤ | |
| SM490C | ≤ 0.18 | ≤ 0.55 | ≤ 1.65 | ≤ 0.035 | ≤ 0.035 | | | | Thickness of Rolled Steel and Coil 5 < t ≤ 16 | No.1A | 15 ≤ | |
| SM490YA | ≤ 0.20 | ≤ 0.55 | ≤ 1.65 | ≤ 0.035 | ≤ 0.035 | 365 ≤ | | 520 – 640 | Thickness of Rolled Steel and Coil t ≤ 5 | No.5 | 19 ≤ | |
| SM490YB | ≤ 0.20 | ≤ 0.55 | ≤ 1.65 | ≤ 0.035 | ≤ 0.035 | | | | Thickness of Rolled Steel and Coil 5 < t ≤ 16 | No.1A | 15 ≤ | |
| SM520B | ≤ 0.20 | ≤ 0.55 | ≤ 1.65 | ≤ 0.035 | ≤ 0.035 | 365 ≤ | | 570 – 720 | Thickness of Rolled Steel and Coil t ≤ 5 | No.5 | 19 ≤ | |
| SM520C | ≤ 0.20 | ≤ 0.55 | ≤ 1.65 | ≤ 0.035 | ≤ 0.035 | | | | Thickness of Rolled Steel and Coil 5 < t ≤ 16 | No.1A | 15 ≤ | |
| SM570 | ≤ 0.18 | ≤ 0.55 | ≤ 1.70 | ≤ 0.035 | ≤ 0.035 | 460 ≤ | | | | Thickness of Rolled Steel and Coil t ≤ 16 | No.5 | 19 ≤ |

Remarks: 1. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
2. Alloying elements other than the above-mentioned ones can be added according to requirements.
3. Impact test is not performed on steel plates with a thickness of 12 mm or less.

JIS G 3113

● Hot-Rolled Steel Sheets and Coils for Automobile Structural Uses

| Designation | Chemical Composition (%) | | Tensile Test | | | | | | | | | | | Bending Test | | | | |
|-------------|--------------------------|---------|-------------------------|-----------------------------|------------------------------|--------------------------|-----------------------------------|--|---------------------------------|----------------------------------|----------------------------------|---------------------------------|----------------------------------|---------------------------|---------------|---------------------------|--------------------------------------|------------|
| | | | Yield Point (N/mm²) | | | Tensile Strength (N/mm²) | Elongation (%), Rolling Direction | | | | | | | | Bending Angle | Inner Diameter | | Test Piece |
| | | | | | | | No.5 Test Piece | | | | | | | | | Inner Diameter | | |
| | P | S | Thickness (mm) t < 6 | Thickness (mm) 6 ≤ t < 8 | Thickness (mm) 8 ≤ t ≤ 14 | | Thickness (mm) 1.6 ≤ t < 2.0 | | Thickness (mm) 2.0 ≤ t < 2.5 | Thickness (mm) 2.5 ≤ t < 3.15 | Thickness (mm) 3.15 ≤ t < 4.0 | Thickness (mm) 4.0 ≤ t < 6.3 | Thickness (mm) 6.3 ≤ t ≤ 14.0 | Thickness (mm) t < 2.0 | | Thickness (mm) 2.0 ≤ t | | |
| SAPH310 | ≤ 0.040 | ≤ 0.040 | (185 ≤) | (185 ≤) | (175 ≤) | 310 ≤ | 33 ≤ | | 34 ≤ | 36 ≤ | 38 ≤ | 40 ≤ | 41 ≤ | 180° | Close overlap | 1.0t | Transverse to No.3 rolling direction | |
| SAPH370 | ≤ 0.040 | ≤ 0.040 | 225 ≤ | 225 ≤ | 215 ≤ | 370 ≤ | 32 ≤ | | 33 ≤ | 35 ≤ | 36 ≤ | 37 ≤ | 38 ≤ | 180° | 0.5t | 1.0t | | |
| SAPH400 | ≤ 0.040 | ≤ 0.040 | 255 ≤ | 235 ≤ | 235 ≤ | 400 ≤ | 31 ≤ | | 32 ≤ | 34 ≤ | 35 ≤ | 36 ≤ | 37 ≤ | 180° | 1.0t | 1.0t | | |
| SAPH440 | ≤ 0.040 | ≤ 0.040 | 305 ≤ | 295 ≤ | 275 ≤ | 440 ≤ | 29 ≤ | | 30 ≤ | 32 ≤ | 33 ≤ | 34 ≤ | 35 ≤ | 180° | 1.0t | 1.5t | | |

Remarks: 1. Values in parentheses are reference values.
2. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
3. We will carry out a bending test at the customer's request.

NIPPON STEEL Standards

● High-Strength Hot-Rolled Steel Sheets and Coils with Automobile Formability

| Designation | Chemical Composition (%) | | | | | Tensile Test | | | | | | | | | | | Bending Test | | | |
|-------------|---------------------------------|--------|---------------------------------|---------------------------------|----------------------------------|-------------------------------------|--|----------------------------------|---------------------------------|---------------------------|----------------------------------|----------------------------|------|------|------------|--|----------------|------|------------|--|
| | | | | | | Yield Point (N/mm ²) | Tensile Strength (N/mm ²) | Elongation (%) | | | | | | | Test Piece | Bending Angle | Inner Diameter | | Test Piece | |
| | Thickness (mm) 1.2 ≤ t < 1.6 | | Thickness (mm) 1.6 ≤ t < 2.0 | Thickness (mm) 2.0 ≤ t < 2.5 | Thickness (mm) 2.5 ≤ t < 3.25 | | | Thickness (mm) 3.25 ≤ t < 4.0 | Thickness (mm) 4.0 ≤ t < 6.3 | Thickness (mm) 6.3 ≤ t | Thickness (mm) 1.6 ≤ t < 3.25 | Thickness (mm) 3.25 ≤ t | | | | | | | | |
| NSHA490 | ≤ 0.18 | ≤ 0.55 | ≤ 1.50 | ≤ 0.030 | ≤ 0.010 | 345 ≤ | 490 ≤ | 24 ≤ | | 24 ≤ | 24 ≤ | 24 ≤ | 26 ≤ | 27 ≤ | 27 ≤ | Transverse to JIS No.5 rolling direction | 180° | 0.5t | 0.5t | Transverse to JIS No.3 rolling direction |
| NSHA540 | | | ≤ 1.60 | | | 375 ≤ | 540 ≤ | 21 ≤ | | 21 ≤ | 22 ≤ | 23 ≤ | 24 ≤ | 24 ≤ | 24 ≤ | | | 1.0t | 1.0t | |
| NSHA590 | | | ≤ 1.70 | | | 440 ≤ | 590 ≤ | 19 ≤ | | 19 ≤ | 20 ≤ | 21 ≤ | 21 ≤ | 22 ≤ | 22 ≤ | | | 1.5t | 1.5t | |
| NSHA690 | | | ≤ 2.00 | | | 550 ≤ | 690 ≤ | — | | 16 ≤ | 17 ≤ | 17 ≤ | 17 ≤ | 17 ≤ | 18 ≤ | | | 2.0t | 2.0t | |
| NSHA780 | | | ≤ 2.20 | | | 685 ≤ | 780 ≤ | — | | 13 ≤ | 14 ≤ | 14 ≤ | 15 ≤ | 15 ≤ | — | | | 2.0t | 2.0t | |
| NSHA980 | | ≤ 1.30 | ≤ 2.60 | 800 ≤ | 980 ≤ | — | — | 10 ≤ | | 10 ≤ | 11 ≤ | 11 ≤ | — | — | — | | | | | |

Remarks: 1. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
2. Alloying elements other than the above-mentioned ones can be added according to requirements.

Examples of Standards — Chemical Compositions and Mechanical Properties

NIPPON STEEL Standards

● Dual Phase High-Strength Hot-Rolled Steel Sheets and Coils with Automobile Formability

| Designation | Chemical Composition (%) | | | | | Tensile Test | | | | | | | | | Hole Expanding Test |
|-------------|---------------------------|---------------------------------|----------------------------------|----------------------------------|---------------------------------|-------------------------------------|--|--|----------------|------|------|------|------|--|----------------------------|
| | | | | | | Yield Point (N/mm ²) | Tensile Strength (N/mm ²) | | Elongation (%) | | | | | Test Piece | Hole Expansion Rate (%) |
| | Thickness (mm) t < 2.0 | Thickness (mm) 2.0 ≤ t < 2.5 | Thickness (mm) 2.5 ≤ t < 3.25 | Thickness (mm) 3.25 ≤ t < 4.0 | Thickness (mm) 4.0 ≤ t ≤ 6.0 | | | | | | | | | | |
| NSHA540D | ≤ 0.12 | ≤ 1.00 | ≤ 1.80 | ≤ 0.035 | ≤ 0.020 | 295 ≤ | 540 ≤ | | 25 ≤ | 26 ≤ | 27 ≤ | 28 ≤ | 28 ≤ | Transverse to JIS No.5 rolling direction | — |
| NSHA590D | ≤ 0.12 | ≤ 1.50 | ≤ 2.00 | ≤ 0.035 | ≤ 0.020 | 325 ≤ | 590 ≤ | | 24 ≤ | 25 ≤ | 26 ≤ | 27 ≤ | 27 ≤ | | — |
| NSHA590DH | ≤ 0.12 | ≤ 1.50 | ≤ 2.00 | ≤ 0.035 | ≤ 0.020 | 440 ≤ | 590 ≤ | | 20 ≤ | 21 ≤ | 21 ≤ | 22 ≤ | 23 ≤ | | 75 ≤ |
| NSHA690D | ≤ 0.14 | ≤ 1.50 | ≤ 2.50 | ≤ 0.035 | ≤ 0.020 | 355 ≤ | 690 ≤ | | 19 ≤ | 20 ≤ | 21 ≤ | 22 ≤ | 22 ≤ | | — |
| NSHA780D | ≤ 0.15 | ≤ 1.50 | ≤ 3.00 | ≤ 0.035 | ≤ 0.020 | 380 ≤ | 780 ≤ | | 16 ≤ | 17 ≤ | 18 ≤ | 19 ≤ | 27 ≤ | | — |

Remarks: 1. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
2. Alloying elements other than the above-mentioned ones can be added according to requirements.

NIPPON STEEL Standards

● High-Hole Expanding High-Strength Hot-Rolled Steel Sheets and Coils with Automobile Formability

| Designation | Chemical Composition (%) | | | | | Tensile Test | | | | | | | | | Hole Expanding Test |
|-------------|--------------------------|--------|--------|---------|---------|-------------------------------------|--|--|---------------------------------|---------------------------------|----------------------------------|----------------------------------|---------------------------------|--|----------------------------|
| | | | | | | Yield Point (N/mm ²) | Tensile Strength (N/mm ²) | | Elongation (%) | | | | | Test Piece | Hole Expansion Rate (%) |
| | | | | | | | | | Thickness (mm) 1.6 ≤ t < 2.0 | Thickness (mm) 2.0 ≤ t < 2.5 | Thickness (mm) 2.5 ≤ t < 3.25 | Thickness (mm) 3.25 ≤ t < 4.0 | Thickness (mm) 4.0 ≤ t ≤ 6.0 | | |
| NSHA370B | ≤ 0.10 | ≤ 0.50 | ≤ 1.50 | ≤ 0.025 | ≤ 0.010 | 225 ≤ | 370 ≤ | | 32 ≤ | 33 ≤ | 35 ≤ | 36 ≤ | 37 ≤ | JIS No.5 rolling direction | 100 ≤ |
| NSHA400B | ≤ 0.10 | ≤ 0.50 | ≤ 1.50 | ≤ 0.025 | ≤ 0.010 | 255 ≤ | 400 ≤ | | 31 ≤ | 32 ≤ | 34 ≤ | 35 ≤ | 36 ≤ | | 100 ≤ |
| NSHA440B | ≤ 0.15 | ≤ 0.80 | ≤ 1.90 | ≤ 0.025 | ≤ 0.010 | 305 ≤ | 440 ≤ | | 29 ≤ | 30 ≤ | 32 ≤ | 33 ≤ | 34 ≤ | | 100 ≤ |
| NSHA490B | ≤ 0.16 | ≤ 0.80 | ≤ 2.00 | ≤ 0.025 | ≤ 0.010 | 335 ≤ | 490 ≤ | | 26 ≤ | 26 ≤ | 26 ≤ | 28 ≤ | 28 ≤ | Transverse to JIS No.5 rolling direction | 90 ≤ |
| NSHA540B | ≤ 0.16 | ≤ 1.00 | ≤ 2.00 | ≤ 0.025 | ≤ 0.010 | 355 ≤ | 540 ≤ | | 24 ≤ | 24 ≤ | 24 ≤ | 26 ≤ | 26 ≤ | | 80 ≤ |
| NSHA590B | ≤ 0.16 | ≤ 1.00 | ≤ 2.20 | ≤ 0.025 | ≤ 0.010 | 440 ≤ | 590 ≤ | | 21 ≤ | 21 ≤ | 21 ≤ | 23 ≤ | 23 ≤ | | 75 ≤ |
| NSHA690B | ≤ 0.16 | ≤ 1.00 | ≤ 2.20 | ≤ 0.025 | ≤ 0.010 | 500 ≤ | 690 ≤ | | — | 17 ≤ | 17 ≤ | 18 ≤ | 18 ≤ | | 65 ≤ |
| NSHA780B | ≤ 0.16 | ≤ 1.00 | ≤ 2.20 | ≤ 0.025 | ≤ 0.010 | 675 ≤ | 780 ≤ | | — | 14 ≤ | 14 ≤ | 15 ≤ | 15 ≤ | | 65 ≤ |
| NSHA980B | ≤ 0.16 | ≤ 1.40 | ≤ 2.60 | ≤ 0.025 | ≤ 0.010 | 780 ≤ | 980 ≤ | | — | 10 ≤ | 10 ≤ | 11 ≤ | 11 ≤ | | 50 ≤ |

Remarks: 1. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
2. Alloying elements other than the above-mentioned ones can be added according to requirements.

NIPPON STEEL Standards

● High-Retained Austenite High-Strength Hot-Rolled Steel Sheets and Coils

| Designation | Chemical Composition (%) | | | | | Tensile Test | | | | | | | |
|-------------|--------------------------|--------|--------|---------|---------|-------------------------------------|--|--|---------------------------------|---------------------------------|----------------------------------|----------------------------------|---------------------------------|
| | | | | | | Yield Point (N/mm ²) | Tensile Strength (N/mm ²) | | Elongation (%) | | | | |
| | | | | | | | | | Thickness (mm) 1.4 ≤ t < 2.0 | Thickness (mm) 2.0 ≤ t < 2.5 | Thickness (mm) 2.5 ≤ t < 3.25 | Thickness (mm) 3.25 ≤ t < 4.0 | Thickness (mm) 4.0 ≤ t ≤ 6.0 |
| NSHA590T | ≤ 0.21 | ≤ 2.20 | ≤ 1.80 | ≤ 0.025 | ≤ 0.010 | 390 ≤ | 590 ≤ | | 25 ≤ | 26 ≤ | 27 ≤ | 28 ≤ | 28 ≤ |
| NSHA690T | ≤ 0.23 | ≤ 2.20 | ≤ 2.00 | ≤ 0.025 | ≤ 0.010 | 440 ≤ | 690 ≤ | | 22 ≤ | 23 ≤ | 24 ≤ | 25 ≤ | 26 ≤ |
| NSHA780T | ≤ 0.25 | ≤ 2.20 | ≤ 2.20 | ≤ 0.025 | ≤ 0.010 | 490 ≤ | 780 ≤ | | 20 ≤ | 21 ≤ | 22 ≤ | 23 ≤ | 24 ≤ |

Remarks: 1. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
2. Alloying elements other than the above-mentioned ones can be added according to requirements.

NIPPON STEEL Standards

● Flooring Sheets and Coils

| Designation | Chemical Composition (%) | | Tensile Test | | | | | | Bending Test | | |
|-------------|--------------------------|---------|-------------------------------------|--|---------------------------|----------------------------------|--|---------------------------------|---------------|--|--|
| | | | Yield Point (N/mm ²) | Tensile Strength (N/mm ²) | Elongation (%) | | | | Bending Angle | Inner Diameter | Test Specimen Rolling Direction |
| | | | | | Thickness (mm) t ≤ 5.0 | Thickness (mm) 5.0 < t ≤ 16.0 | | Test Specimen Rolling Direction | | Thickness | |
| | P | S | | | | | | | | | |
| NFP | — | — | — | (270 ≤) | — | — | | — | — | — | |
| NFP400 | ≤ 0.050 | ≤ 0.050 | 245 ≤ | 400 – 510 | 21 ≤ | 17 ≤ | | 180° | 1.5t | Thickness t ≤ 5.0 JIS No.5 | Thickness t ≤ 5.0 JIS No.3 |
| | | | | | | | | | | Thickness 5.0 < t ≤ 16.0 JIS No.1A | Thickness 5.0 < t ≤ 16.0 JIS No.1 |

Remarks: 1. Values in parentheses are reference values.
2. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).

Examples of Standards — Chemical Compositions and Mechanical Properties

NIPPON STEEL Standards

● Atmospheric Corrosion-Resistant Steel Sheets and Coils

| Designation | Chemical Composition (%) | | | | | | | | | | Tensile Test | | | | | Bending Test | | | |
|-------------|--------------------------|-------------|-------------|-------------|---------|-------------|-------------|--------|--------|--|-------------------------------------|--|-------------------|-------------------|------------------------------------|-------------------|---------------|-----------------------------|------------------------------------|
| | | | | | | | | | | | Yield Point (N/mm ²) | Tensile Strength (N/mm ²) | Elongation | | | Thickness (mm) | Bending Angle | Inner Diameter Thickness | Test Specimen Rolling Direction |
| | | | | | | | | | | | | | Thickness (mm) | Elongation (%) | Test Specimen Rolling Direction | | | | |
| NAW400 | — | — | — | ≤ 0.15 | ≤ 0.050 | 0.20 – 0.40 | ≤ 0.40 | — | — | | 245 ≤ | 400 – 510 | t ≤ 5.0 | 21 ≤ | JIS No.5 | t ≤ 5.0 | 180° | 1.0t | JIS No.3 |
| | | | | | | | | | | | | | 5.0 < t | 17 ≤ | JIS No.1A | 5.0 < t | 180° | 1.5t | JIS No.1 |
| NAW490 | ≤ 0.12 | 0.15 – 0.35 | ≤ 0.90 | 0.06 – 0.12 | ≤ 0.035 | 0.25 – 0.50 | — | — | ≤ 0.15 | | 390 ≤ | 490 ≤ | t < 6.0 | 22 ≤ | JIS No.5 | t < 6.0 | 180° | 1.0t | JIS No.3 |
| | | | | | | | | | | | | | 6.0 ≤ t | 23 ≤ | JIS No.5 | 6.0 ≤ t | 180° | 1.5t | JIS No.1 |
| COR-TEN O | ≤ 0.12 | 0.25 – 0.75 | 0.20 – 0.50 | 0.07 – 0.15 | ≤ 0.035 | 0.25 – 0.55 | 0.30 – 1.25 | ≤ 0.65 | — | | 355 ≤ | 490 ≤ | t ≤ 5.0 | 22 ≤ | JIS No.5 | t ≤ 5.0 | 180° | 1.0t | JIS No.3 |
| | | | | | | | | | | | | | 5.0 < t ≤ 16 | 18 ≤ | JIS No.5 | 5.0 < t | 180° | 1.5t | JIS No.1 |
| | | | | | | | | | | | | | 16 < t ≤ 20 | 21 ≤ | JIS No.1A | | | | |

Remarks: 1. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
2. We will carry out a bending test at the customer's request.

NIPPON STEEL Standards

● Weldable High-Strength Steel Sheets and Coils

| Designation | Chemical Composition (%) | | | | | | | Tensile Test | | | | | Bending Test | | | Impact Test | | | |
|---------------|--------------------------|-------------------|---|-------------------|---------------------|---|-------------------|-------------------------------------|---|--|-------------------|---|-------------------|---------------|---------------------|---|---|-------|------|
| | | | | | | | | Yield Point (N/mm ²) | Tensile Strength (N/mm ²) | | Elongation | | | Bending Angle | Inner Diameter | Test Specimen Transverse to the Rolling Direction | 2 mm V-notch Test Specimen | | |
| | Thickness (mm) | Elongation (%) | Test Specimen Transverse to the Rolling Direction | Thickness (mm) | Test Temperature | Absorbed Energy (average of the three) (J) | | | | | | | | | | | | | |
| | | | | | | | Thickness (mm) | | | | Elongation (%) | Test Specimen Transverse to the Rolling Direction | Thickness (mm) | | Test Temperature | | Absorbed Energy (average of the three) (J) | | |
| WEL-TEN 540 | ≤ 0.20 | ≤ 0.55 | ≤ 1.70 | ≤ 0.035 | ≤ 0.035 | — | ≤ 0.45 | 355 ≤ | 540 ≤ | | t ≤ 16 | 20 ≤ | JIS No.5 | 180° | 1.5t | JIS No.1 | 12 < t | 0°C | 47 ≤ |
| | | | | | | | | | | | 16 < t ≤ 20 | 28 ≤ | JIS No.5 | | | | | | |
| | | | | | | | | | | | 20 < t | 23 ≤ | JIS No.4 | | | | | | |
| WEL-TEN 590RE | ≤ 0.12 | ≤ 0.55 | ≤ 2.00 | ≤ 0.030 | ≤ 0.025 | ≤ 0.15 | ≤ 0.45 | 450 ≤ | 590 – 710 | | t ≤ 16 | 20 ≤ | JIS No.5 | 180° | 1.5t | JIS No.1 | 12 < t | –5°C | 47 ≤ |
| | | | | | | | | | | | 16 < t ≤ 20 | 28 ≤ | JIS No.5 | | | | | | |
| | | | | | | | | | | | 20 < t | 20 ≤ | JIS No.4 | | | | | | |
| WEL-TEN 690RE | ≤ 0.14 | ≤ 0.55 | ≤ 2.00 | ≤ 0.030 | ≤ 0.025 | ≤ 0.25 | ≤ 0.50 | 590 ≤ | 690 – 830 | | t ≤ 16 | 17 ≤ | JIS No.5 | 180° | 1.5t | JIS No.1 | 12 < t | –15°C | 47 ≤ |
| | | | | | | | | | | | 16 < t | 25 ≤ | JIS No.5 | | | | | | |
| WEL-TEN 780RE | ≤ 0.16 | ≤ 0.55 | ≤ 2.00 | ≤ 0.025 | ≤ 0.030 | ≤ 0.30 | ≤ 0.55 | 625 ≤ | 780 – 930 | | t ≤ 9 | 15 ≤ | JIS No.5 | 180° | 1.5t | JIS No.1 | — | — | — |

Remarks: 1. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
2. Ceq. = C + Mn/6 + Si/24 + Ni/40 + Cr/5 + Mo/4 + V/14
3. We will carry out a bending test at the customer's request.

NIPPON STEEL Standards

● Sulfur Dew-Point Corrosion-Resistant Steel Sheets and Coils

| Designation | Chemical Composition (%) | | | | | | | | | | Tensile Test | | | | | Bending Test | | |
|-------------|--------------------------|-------------|--------|---------|---------|-------------|-------------|--------|--------|--|-------------------|-------------------------------------|--|-------------------|------------------------------------|---------------|-----------------------------|---|
| | | | | | | | | | | | Thickness (mm) | Yield Point (N/mm ²) | Tensile Strength (N/mm ²) | Elongation | | Bending Angle | Inner Diameter Thickness | Test Specimen Transverse to the Rolling Direction |
| | | | | | | | | | | | | | | Elongation (%) | Test Specimen Rolling Direction | | | |
| S-TEN 1 | ≤ 0.14 | ≤ 0.55 | ≤ 1.60 | ≤ 0.025 | ≤ 0.025 | 0.25 – 0.50 | — | — | ≤ 0.15 | | t ≤ 16 | 245 ≤ | 400 – 540 | 23 ≤ | JIS No.5 | 180° | 1.5t | JIS No.1 |
| S-TEN 2 | ≤ 0.14 | 0.15 – 0.55 | ≤ 1.60 | ≤ 0.035 | ≤ 0.035 | 0.25 – 0.55 | 0.50 – 1.00 | ≤ 0.15 | — | | t ≤ 16 | 325 ≤ | 440 – 540 | 22 ≤ | JIS No.5 | 180° | 1.5t | JIS No.1 |

Remarks: 1. Mechanical test values do not apply to abnormal parts at both ends of steel strip (coils).
2. We will carry out a bending test at the customer's request.
3. S-TEN 1: Mn ≥ 2.5×[C]

NIPPON STEEL Standards

● Longitudinally Stripped Steel Sheets and Coils

(There are no specifications of chemical components or mechanical properties. Normal tensile strength is 270 N/mm² or more.)

Examples of Standards — Dimensional Tolerances

JIS G 3193

● Shape, Dimensions, Weight, and Tolerance of Hot-Rolled Steel Sheets and Coils. Thickness Tolerance of NIPPON STEEL Standards
Flooring Sheets and Coils (NFP series), Longitudinally Stripped Steel Sheets and Coils (NFPA series), Atmospheric Corrosion-Resistant Steel
Sheets and Coils (NAW series), Weldable High-Strength Steel Sheets and Coils (WEL-TEN series), Sulfur Dew-Point Corrosion-Resistant
Steel Sheets and Coils (S-TEN series).

● Thickness Tolerance (unit: mm)

| Thickness \ Width | W < 1,600 | 1,600 ≤ W < 2,000 | 2,000 ≤ W < 2,500 |
|-------------------|-----------|-------------------|-------------------|
| t < 1.25 | ±0.16 | — | — |
| 1.25 ≤ t < 1.60 | ±0.18 | — | — |
| 1.60 ≤ t < 2.00 | ±0.19 | ±0.23 | — |
| 2.00 ≤ t < 2.50 | ±0.20 | ±0.25 | — |
| 2.50 ≤ t < 3.15 | ±0.22 | ±0.29 | ±0.29 |
| 3.15 ≤ t < 4.00 | ±0.24 | ±0.34 | ±0.34 |
| 4.00 ≤ t < 5.00 | ±0.45 | ±0.55 | ±0.55 |
| 5.00 ≤ t < 6.30 | ±0.50 | ±0.60 | ±0.60 |
| 6.30 ≤ t < 10.0 | ±0.55 | ±0.65 | ±0.65 |
| 10.0 ≤ t < 16.0 | ±0.55 | ±0.65 | ±0.65 |
| 16.0 ≤ t < 25.0 | ±0.65 | ±0.75 | ±0.75 |

Remarks:
1. As required, the above-mentioned tolerance of the (+) side or (-) side can be limited. However, in this case, the total tolerance is equal to the tolerance in the table on the left.
2. The measuring positions for steel coil thickness are as follows: in the case of a mill edged steel coil or sheet, an arbitrary point 25 mm or more from the edge is selected; for a cut edged steel plate or sheet cut from coil, an arbitrary point of 15 mm or more from the edge is selected. And for as-rolled steel plate, a measuring point inside the expected cutting line is arbitrarily selected. In the case of a cut edged steel plate, a point 15 mm or more from the edge is arbitrarily selected.
NOTE: JIS G 3193 is applied to JIS G 3101 (or SS 330) and to JIS G 3106 (SM400A).

● Width Tolerance (unit: mm)

| Width | Thickness | Tolerance | | | | | | |
|-------------------|-----------------|-----------------------|------------------------------|----------|---|-----|---|------|
| | | Mill Edge | | Cut Edge | | | | |
| | | As-Rolled Steel Plate | Coil, or Sheet Cut from Coil | A | | B | | C |
| + | − | | | + | − | | | |
| W < 160 | t < 3.15 | — | { ±2 — | 5 | 0 | 2.0 | 0 | ±0.3 |
| | 3.15 ≤ t < 6.00 | | | 5 | | 3.0 | | ±0.5 |
| | 6.00 ≤ t < 20.0 | | | 10 | | 4.0 | | — |
| | 20.0 ≤ t | | | 10 | | — | | — |
| 160 ≤ W < 250 | t < 3.15 | — | { ±2 — | 5 | 0 | 2.0 | 0 | ±0.4 |
| | 3.15 ≤ t < 6.00 | | | 5 | | 3.0 | | ±0.5 |
| | 6.00 ≤ t < 20.0 | | | 10 | | 4.0 | | — |
| | 20.0 ≤ t | | | 15 | | — | | — |
| 250 ≤ W < 400 | t < 3.15 | 0 + Not specified | { ±5 — | 5 | 0 | 2.0 | 0 | ±0.5 |
| | 3.15 ≤ t < 6.00 | | | 5 | | 3.0 | | ±0.5 |
| | 6.00 ≤ t < 20.0 | | | 10 | | 4.0 | | — |
| | 20.0 ≤ t | | | 15 | | — | | — |
| 400 ≤ W < 630 | t < 3.15 | 0 + Not specified | { ±20 0 — | 10 | 0 | 3.0 | 0 | ±0.5 |
| | 3.15 ≤ t < 6.00 | | | 10 | | 3.0 | | ±0.5 |
| | 6.00 ≤ t < 20.0 | | | 10 | | 5.0 | | — |
| | 20.0 ≤ t | | | 15 | | — | | — |
| 630 ≤ W < 1,000 | t < 3.15 | 0 + Not specified | + 25 0 | 10 | 0 | 4.0 | 0 | — |
| | 3.15 ≤ t < 6.00 | | | 10 | | 4.0 | | |
| | 6.00 ≤ t < 20.0 | | | 10 | | 6.0 | | |
| | 20.0 ≤ t | | | 15 | | — | | |
| 1,000 ≤ W < 1,250 | t < 3.15 | 0 + Not specified | + 30 0 | 10 | 0 | 4.0 | 0 | — |
| | 3.15 ≤ t < 6.00 | | | 10 | | 4.0 | | |
| | 6.00 ≤ t < 20.0 | | | 15 | | 6.0 | | |
| | 20.0 ≤ t | | | 15 | | — | | |
| 1,250 ≤ W < 1,600 | t < 3.15 | 0 + Not specified | + 35 0 | 10 | 0 | 4.0 | 0 | — |
| | 3.15 ≤ t < 6.00 | | | 10 | | 4.0 | | |
| | 6.00 ≤ t < 20.0 | | | 15 | | 6.0 | | |
| | 20.0 ≤ t | | | 15 | | — | | |
| 1,600 ≤ W | t < 3.15 | 0 + Not specified | + 40 0 | 10 | 0 | 4.0 | 0 | — |
| | 3.15 ≤ t < 6.00 | | | 10 | | 4.0 | | |
| | 6.00 ≤ t < 20.0 | | | 20 | | 6.0 | | |
| | 20.0 ≤ t | | | 20 | | — | | |

Remarks:
The tolerance of a mill edged strip, or sheet cut from coil, with a width less than 400 mm, is limited by adjusting at the (-) side to 0. In this case, the tolerance of the (+) side becomes twice the value.
NOTE: Tolerance A, B, and C of the width of the cutting edge are determined by the following methods. A: normal cutting method; B: recutting or precise cutting method; C: slit method.

JIS G 3113 (SAPH), 3116 (SG255, SG295), 3131 (SPHC, SPHD, SPHE, SPHF), 3132 (SPHT1, SPHT2, SPHT3)

● TS490N/mm² under NIPPON STEEL Standards
High-Hole Expanding Formability Hot-Rolled Steel Sheets and Coils (NSHA370B · 400B · 440B)

● Thickness Tolerance (unit: mm)

| Thickness \ Width | W < 1,200 | 1,200 ≤ W < 1,500 | 1,500 ≤ W < 1,800 | 1,800 ≤ W |
|-------------------|-----------|-------------------|-------------------|-----------|
| t < 1.60 | ±0.14 | ±0.15 | ±0.16 | — |
| 1.60 ≤ t < 2.00 | ±0.16 | ±0.17 | ±0.18 | ±0.21 |
| 2.00 ≤ t < 2.50 | ±0.17 | ±0.19 | ±0.21 | ±0.25 |
| 2.50 ≤ t < 3.15 | ±0.19 | ±0.21 | ±0.24 | ±0.26 |
| 3.15 ≤ t < 4.00 | ±0.21 | ±0.23 | ±0.26 | ±0.27 |
| 4.00 ≤ t < 5.00 | ±0.24 | ±0.26 | ±0.28 | ±0.29 |
| 5.00 ≤ t < 6.00 | ±0.26 | ±0.28 | ±0.29 | ±0.31 |
| 6.00 ≤ t < 8.00 | ±0.29 | ±0.30 | ±0.31 | ±0.35 |
| 8.00 ≤ t < 10.0 | ±0.32 | ±0.33 | ±0.34 | ±0.40 |
| 10.0 ≤ t < 12.5 | ±0.35 | ±0.36 | ±0.37 | ±0.45 |
| 12.5 ≤ t ≤ 14.0 | ±0.38 | ±0.39 | ±0.40 | ±0.50 |

Remarks:
1. Thickness measurement points conform to the standards.
2. This method does not apply to abnormal parts at both ends of a steel coil.
3. The application of thickness and width is provided in the appropriate standards.
NOTE: Width tolerance refers to JIS G 3193.

JIS G 3116 (SG325, SG365), 3132 (SPHT4), 3134 (SPFH)

● TS490N/mm² and over NIPPON STEEL Standards
Dual Phase High-Strength Hot-Rolled Steel Sheets and Coils with Formability (NSHA D), High-Hole Expanding Formability Hot-Rolled Steel
Sheets and Coils (NSHA490B · 540B · 590B · 690B · 780B), High-Retained Austenite, High-Strength Hot-Rolled Steel Sheets and Coils (NSHA T)

● Thickness Tolerance (unit: mm)

| Thickness \ Width | W < 1,200 | 1,200 ≤ W < 1,500 | 1,500 ≤ W < 1,800 | 1,800 ≤ W |
|-------------------|-----------|-------------------|-------------------|-----------|
| t < 1.60 | ±0.14 | ±0.15 | ±0.16 | — |
| 1.60 ≤ t < 2.00 | ±0.16 | ±0.19 | ±0.20 | — |
| 2.00 ≤ t < 2.50 | ±0.18 | ±0.22 | ±0.23 | ±0.25 |
| 2.50 ≤ t < 3.15 | ±0.20 | ±0.24 | ±0.26 | ±0.29 |
| 3.15 ≤ t < 4.00 | ±0.23 | ±0.26 | ±0.28 | ±0.30 |
| 4.00 ≤ t < 5.00 | ±0.26 | ±0.29 | ±0.31 | ±0.32 |
| 5.00 ≤ t < 6.00 | ±0.29 | ±0.31 | ±0.32 | ±0.34 |
| 6.00 ≤ t < 8.00 | ±0.32 | ±0.33 | ±0.34 | ±0.38 |
| 8.00 ≤ t < 10.0 | ±0.35 | ±0.36 | ±0.37 | ±0.44 |
| 10.0 ≤ t < 12.5 | ±0.38 | ±0.40 | ±0.41 | ±0.49 |

Remarks:
1. Thickness measurement points conform to the standards.
2. This method does not apply to abnormal parts at both ends of a steel coil.
3. The application of thickness and width is provided in the appropriate standards.
NOTE: Width tolerance refers to JIS G 3193.

NIPPON STEEL Standards - High-Strength Hot-Rolled Steel Sheets and Coils with Formability (NSHA)

● Thickness Tolerance (unit: mm)

| Thickness \ Width | W < 1,200 | 1,200 ≤ W < 1,500 | 1,500 ≤ W < 1,800 | 1,800 ≤ W ≤ 2,300 |
|-------------------|-----------|-------------------|-------------------|-------------------|
| 1.20 ≤ t < 1.60 | ±0.16 | ±0.19 | — | — |
| 1.60 ≤ t < 2.00 | ±0.16 | ±0.19 | ±0.20 | — |
| 2.00 ≤ t < 2.50 | ±0.18 | ±0.22 | ±0.23 | ±0.25 |
| 2.50 ≤ t < 3.15 | ±0.20 | ±0.24 | ±0.26 | ±0.29 |
| 3.15 ≤ t < 4.00 | ±0.23 | ±0.26 | ±0.28 | ±0.30 |
| 4.00 ≤ t < 5.00 | ±0.26 | ±0.29 | ±0.31 | ±0.32 |
| 5.00 ≤ t < 6.00 | ±0.29 | ±0.31 | ±0.32 | ±0.34 |
| 6.00 ≤ t < 8.00 | ±0.32 | ±0.33 | ±0.34 | ±0.38 |
| 8.00 ≤ t < 10.0 | ±0.35 | ±0.36 | ±0.37 | ±0.44 |
| 10.0 ≤ t ≤ 12.0 | ±0.38 | ±0.40 | ±0.41 | ±0.49 |

Remarks:
1. Thickness measurement points conform to the standards.
2. This method does not apply to abnormal parts at both ends of a steel coil.
3. The application of thickness and width is provided in the appropriate standards.
NOTE: Width tolerance refers to JIS G 3193.

Reference Tables

1. Standard Size and Weight for Hot-Rolled Steel Sheets

| 1. Standard Size and Weight for Hot-Rolled Steel Sheets | | | | | | | | | | | | | | (Unit: kg) |
|---|----|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|-------------------|-------------------|--------------------|------------|
| Width x length Thickness mm | mm | 914 x 1829 | 1219 x 2438 | 1219 x 3048 | 1219 x 4877 | 1219 x 6096 | 1524 x 3048 | 1524 x 6096 | 1524 x 9144 | 1524 x 12192 | 1829 x 6096 | 1829 x 9144 | 1829 x 12192 | |
| | ft | 3x6 | 4x8 | 4x10 | 4x16 | 4x20 | 5x10 | 5x20 | 5x30 | 5x40 | 6x20 | 6x30 | 6x40 | |
| 1.2 1.6 1.8 2 | | 15.8 | — | — | — | — | — | — | — | — | — | — | — | |
| | | 21 | 37.3 | 46.7 | 74.7 | 93.3 | — | — | — | — | — | — | — | |
| | | 23.6 | 42 | 52.5 | 84 | 105 | — | — | — | — | — | — | — | |
| | | 26.3 | 46.7 | 58.3 | 93.3 | 117 | — | — | — | — | — | — | — | |
| 2.3 2.6 2.9 3 | | 30.2 | 53.7 | 67.1 | 107 | 134 | 83.9 | 168 | 252 | 336 | — | — | — | |
| | | 34.1 | 60.7 | 75.8 | 121 | 152 | 94.8 | 190 | 285 | 379 | — | — | — | |
| | | 38.1 | 67.6 | 84.6 | 135 | 169 | 106 | 211 | 317 | 423 | — | — | — | |
| | | 39.4 | 70 | 87.5 | 140 | 175 | 109 | 219 | 328 | 438 | — | — | — | |
| 3.2 3.5 4 4.5 | | 42 | 74.7 | 93.3 | 149 | 187 | 117 | 233 | 350 | 467 | 280 | 420 | 560 | |
| | | 45.9 | 81.7 | 102 | 163 | 204 | 128 | 255 | 383 | 511 | 306 | 459 | 613 | |
| | | 52.5 | 93.3 | 117 | 187 | 233 | 146 | 292 | 438 | 583 | 350 | 525 | 700 | |
| | | 59.1 | 105 | 131 | 210 | 262 | 164 | 328 | 492 | 656 | 394 | 591 | 788 | |
| 5 5.5 6 7 | | 65.6 | 117 | 146 | 233 | 292 | 182 | 365 | 547 | 729 | 438 | 656 | 875 | |
| | | 72.2 | 128 | 160 | 257 | 321 | 201 | 401 | 602 | 802 | 481 | 722 | 963 | |
| | | 78.8 | 140 | 175 | 280 | 350 | 219 | 438 | 657 | 875 | 525 | 788 | 1050 | |
| | | 91.9 | 163 | 204 | 327 | 408 | 255 | 510 | 766 | 1021 | 613 | 919 | 1225 | |
| 8 9 10 11 | | 105 | 187 | 233 | 373 | 467 | 292 | 583 | 875 | 1167 | 700 | 1050 | 1400 | |
| | | 118 | 210 | 263 | 420 | 525 | 328 | 656 | 985 | 1313 | 788 | 1181 | 1575 | |
| | | 131 | 233 | 292 | 467 | 583 | 365 | 729 | 1094 | 1459 | 875 | 1313 | 1751 | |
| | | 144 | 257 | 321 | 513 | 642 | 401 | 802 | 1204 | 1604 | 963 | 1444 | 1926 | |
| 12 13 14 15 | | 158 | 280 | 350 | 560 | 700 | 438 | 875 | 1313 | 1750 | 1050 | 1575 | 2101 | |
| | | 171 | 303 | 379 | 606 | 758 | 474 | 948 | 1422 | 1895 | 1137 | 1705 | 2275 | |
| | | 184 | 327 | 408 | 653 | 817 | 510 | 1021 | 1532 | 2042 | 1225 | 1838 | 2451 | |
| | | 197 | 350 | 438 | 700 | 875 | 547 | 1094 | 1642 | 2189 | 1313 | 1970 | 2627 | |
| 16 17 18 19 | | 210 | 373 | 467 | 747 | 933 | 583 | 1167 | 1751 | 2334 | 1400 | 2100 | 2801 | |
| | | 223 | 396 | 496 | 793 | 991 | 620 | 1239 | 1860 | 2479 | 1487 | 2230 | 2975 | |
| | | 236 | 420 | 525 | 840 | 1050 | 656 | 1313 | 1970 | 2625 | 1575 | 2363 | 3151 | |
| | | 249 | 443 | 554 | 887 | 1109 | 693 | 1386 | 2080 | 2772 | 1664 | 2495 | 3327 | |

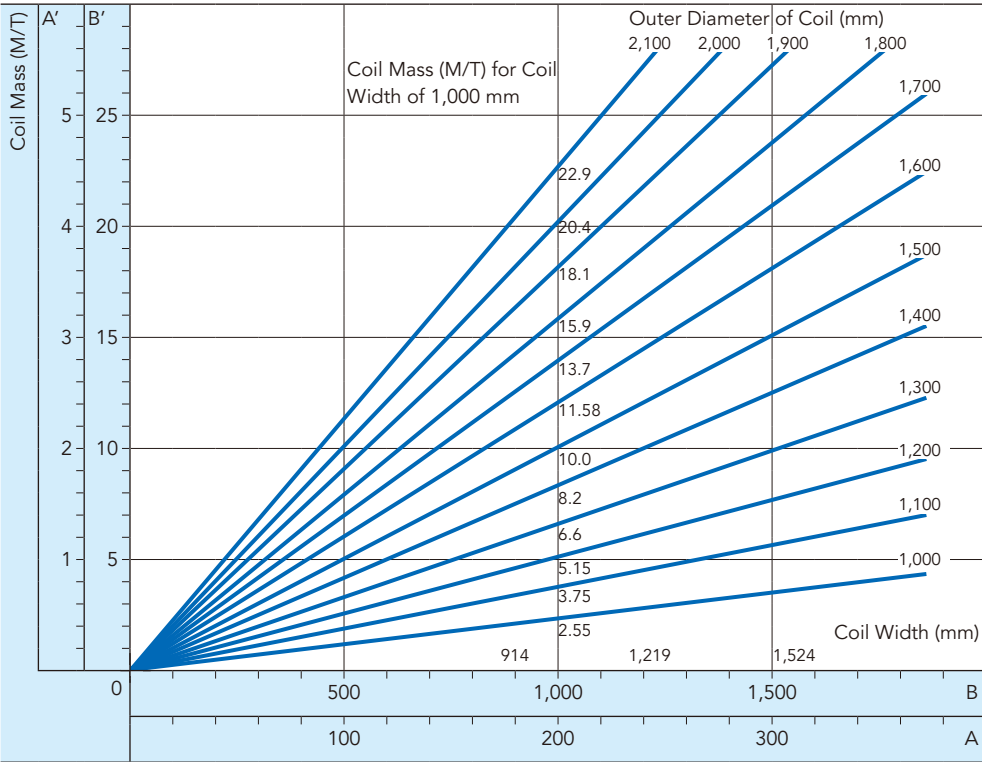
2. Calculation Chart Example for Coil Width, Inner Diameter, Outer Diameter, and Mass

Inner Diameter of Coil: 30" (762 mm)

Abscissa A to Ordinate A'
Abscissa B to Ordinate B'

$W = \pi/4 \times \omega \times 7.85 \times 0.97 (D^2 - 762^2)$

W : Coil Mass (M/T)
 ω : Coil Width (mm)
0.97 : Coil Occupying Area Ratio
D : Outer Diameter of Coil (mm)



Information on Usage

Hot-Rolled Steel Sheets and Coils are produced in a wide range of grades, each having its own unique characteristics. Selection of the right grade, therefore, is essential for the most economical production of high-quality end products.

NIPPON STEEL can help customers choose the grade best suited for each application. We are also ready to cooperate with customers by offering optimal technical and production support.

1. Plating Finish

Hot-rolled sheets (pickled) are coated with oil for protection against rusting. The lubricating oil used in the forming process may also remain on the surface. All traces of such oil and impurities present on the surface must be removed before beginning the plating operations.

Degreasing can be achieved by various methods, including those using emulsions, alkali cleaners, etc. Of these, alkali cleaning is most widely employed because of its economy and ease of handling.

The most commonly used alkali cleaners include caustic soda, carbonic soda and sodium silicate. Time, temperature, and agitation are the determining factors in degreasing.

A surfactant added to the solution usually improves the degreasing effectiveness.

Types of steel that contain a sizable amount of silicon can cause defective plating. Please contact us as we have steels that are compatible with plating.

2. Antirust

In order to provide maximum protection against rusting and at the same time to facilitate degreasing, hot-rolled sheets are lightly and uniformly treated with an oil that is low in viscosity and easy to remove but still provides superior protection against rusting. Since the sheets are only lightly oiled, they may rust if left exposed for an unreasonably long time after unpacking. Unpacked sheets, therefore, should be used without undue delay. When production conditions make it necessary to keep the unpacked or fabricated sheets exposed for a certain period of time before painting or plating, the following precautions should be taken.

- a. Since humidity of or over 70 percent usually accelerates the formation of rust, sheets should be kept in an environment with less than 60 percent humidity.
- b. Air pollution also affects rusting. Hygroscopic substances such as hydrochloric acid gas, ammonium chloride gas and seawater salt particles accelerate rust even when humidity is 60 percent or less or temperatures are above the dew point.
- c. Dust and stains present on the surface tend to break the protective oil film, produce local galvanic activity with the base metal, and cause rust.

3. Welding

Manufacture of satisfactory end products heavily depends upon the selection of proper welding methods and welder skills. Steel sheets may

be welded by one of the following methods. The proper method should be determined on the basis of the required appearance and strength of the end products as well as economic considerations.

● Gas Welding

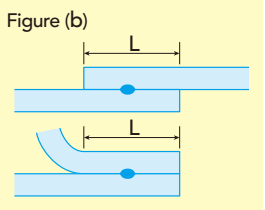
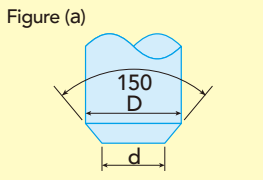
For oxyacetylene welding, the highest possible grade of acetylene should be used. For this method, JIS Specification Z 3201 (Gas Welding Rods for Mild Steel) rods are recommended.

● Submerged-Arc Welding

Of the electrodes produced to JIS Specification Z 3211 (Covered Electrodes for Mild Steel), high oxygenation titania or lime titania types are recommended because of their capacity of producing excellent bead appearance and penetration.

● Resistance Welding

- a. Adequate weld strength cannot be obtained if the welded joint is not in the nugget form.
- b. Seam welding
Seam welding may be considered a variation of continuous spot welding. Good seam welds are obtained by increasing the electrical current to 1.5 to 2.0 times and the pressure to 1.2 to 1.6 times to those of a spot welding.



4. Coils

The use of coils generally has more advantage than the use of steel sheets, as means of improving yield ratio and automating line production. Coil is the material from which sheet is cut, and possesses characteristics which differs from those of a sheet. Thus effective use of coil improves productivity.

● Use of Coil Materials

Coils may contain defective portions attributable to surface imperfections, and thus it is necessary to conduct inspection, selection and rectification. Off-gauge portions at both edges of coils are removed as a rule, but off-gauge portions at welds and their vicinities may be included, for which due attention should be paid. The material quality of coil is not different from that of sheet.

Packaging and Labeling

Our products are shipped bundled and packaged to prevent any possible damages possibly caused by ordinary handling practices or storage conditions prior to actual use. As the products have packaging labels affixed describing the shipped content, please see the affixed label to confirm the product after receipt.

1. Package Label Information

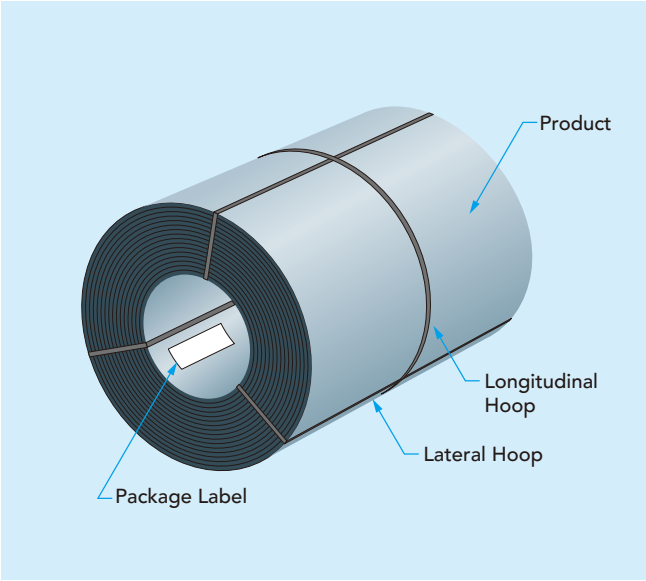
| Item | Description |
|------------------------|--|
| Product Name | Describes a specified product name. |
| JIS Certification Mark | JIS is marked on the label of products authorized to designate the JIS certification mark. |
| Standards Designation | Code of Standards Name, Standards Number, and Standards Code. |
| Dimensions | The ordered size (thickness width length) is marked. For coil, "C" is marked in place of length. |
| Net Mass | The actual net or calculated mass is marked in accordance with contract terms and conditions. |
| Sheets | The actual number of sheets contained. |
| Coils | Marked only if two or more hoops are bundled. |
| Inspection Number | Marked with the unit inspection number for each shipped product. |
| Coil Number | Marked with the production lot unit coil number. |
| Steel Making Number | Marked with the production lot unit steel making number. |
| User Name | User's name. |
| Maker's Name | NIPPON STEEL CORPORATION |
| Works | (Location Name) WORKS (or AREA) |

2. Package Label Sample

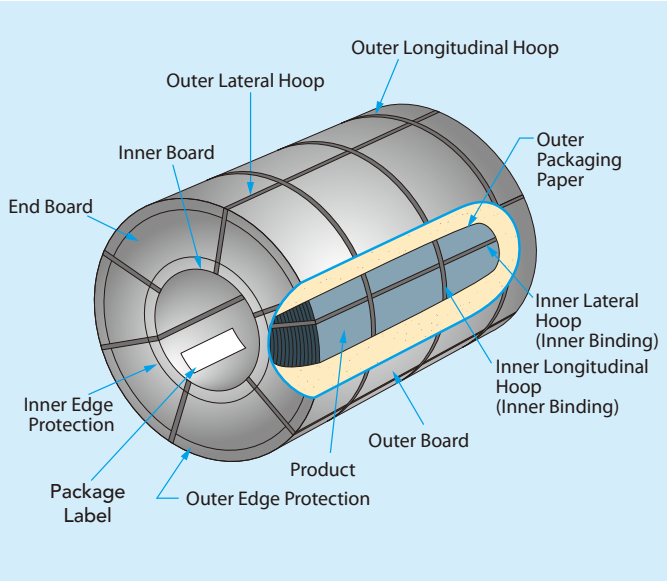
| | | |
|--|-----------------------|----------------------------|
| HOT ROLLED STEEL SHEETS (Pickled) | | |
| SPECIFICATION SAPH440 | | |
| SIZE 3.6 × 1050 × C | | |
| NET MASS (THEO) 4,440KG | | |
| INSPECTION NO. PW14731 | COIL NO. L88330-11 | STEEL MAKING NO. TP7790 |
| | | |
| | | |
| NIPPON STEEL CORPORATION ○○ WORKS (or AREA) | | |

3. Packaging Sample

<As-Rolled Coil>



<Pickled Coil>



Ordering Information

When you order, please check the following items according to the intended use.

| | |
|-------------------------------|---|
| Specifications | Hot-Rolled Steel Sheets and Coils are produced in a wide range of grades satisfying both JIS and NIPPON STEEL specifications. Select the most suitable specifications by intended use, degree of fabrication, method of fabrication, and other factors. Inquire if any questions arise. If you have any questions, please contact NIPPON STEEL. |
| Dimensions | Thickness varies in increments of 0.1 mm as a rule. This may be reduced to increments of 0.05 mm in special cases. Width and length may be specified at increments of 1 mm. |
| Packaging Mass | Specify the packaging mass based on unloading capacity and working conditions. Cut sheets: Normally, 2 tons or more are standard. Coils: Normally available from 5 to 20 tons. Specify the maximum weight (and the minimum weight if necessary). |
| Coil Inside/Outside Diameters | For coils, the inside diameters of 762 mm (30 inches) or 610 mm (24 inches) are standard. Specify the maximum outside diameter acceptable, if necessary. |
| Surface Finish | Specify finish: black finish (as-rolled), pickled finish, or shot blasted finish. |
| Oiling | Specify either "oiled" or "unoiled". Normally, rust-prevention "oiled" products are produced. |
| Roll Edge Finish | Specify either "mill edge" or "slit edge" depending on your use condition. Slit edges are recommended, especially if the delivered product will be used as-rolled and without further processing, thus requiring edge finishing, or when strict width tolerance is required. |
| Applications | NIPPON STEEL exercises through quality control over the entire manufacturing process in order to suit the products to our customers' intended use. Therefore, when placing orders we kindly request our customers to present information necessary for quality control, such as intended use and the method of fabrication. |
| Other | Some intended applications require rigorous specifications of assembly accuracy, component accuracy, and other conditions. If there are any requests of such kind, please consult with NIPPON STEEL beforehand to clarify the required specifications. |