
Steel products — Vocabulary

Produits en acier — Vocabulaire

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

The committee responsible for this document is ISO/TC 17, *Steel*.

This second edition cancels and replaces the first edition (ISO 6929:1987), which has been technically revised.

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Steel products — Vocabulary

Scope

This International Standard defines terms for steel products according to their

- a) stage of manufacture,
- b) shape and dimensions, and
- c) appearance.

NOTE 1 Although the products are generally defined independently of their end uses or manufacturing processes, it has sometimes been necessary to make reference to these criteria.

NOTE 2 All dimensions given in this International Standard are nominal.

NOTE 3 See the list of terms and relevant subclauses in [Annexes A](#) and [B](#).

1 Terms and definitions

1.1 Liquid steel

1.1.1

liquid steel

steel in the liquid state ready for pouring and obtained from the melting of raw materials

1.2 Ingots and semi-finished products

1.2.1

ingot

product obtained by pouring liquid steel into moulds of a shape appropriate to the subsequent processing into semi-finished products, or flat or long products, generally by hot rolling or forging

Note 1 to entry: The shape generally resembles a truncated pyramid or truncated cone, the side surfaces may be corrugated and the corners more or less rounded. Depending on subsequent conversion requirements, ingots may be dressed or hot scarfed or both, or cropped without altering their status as “ingots”.

Note 2 to entry: According to the cross-sectional shape and dimensions, a distinction is made between the following:

- a) ingots, having a cross section that may be square, rectangular (of width up to twice the thickness), polygonal, round, oval, or shaped according to the profile to be rolled;
- b) slab ingots, of rectangular cross section of width twice the thickness or over.

1.2.2

semi-finished product

product obtained by

- a) continuous casting that may or may not be followed by rolling, forging, or cutting,
- b) pressure casting, and
- c) rolling, forging, or cutting of ingots or large sections of continuous cast products and generally intended for conversion into flat or long products by hot rolling or forging, or for the manufacture of forgings

Note 1 to entry: The cross sections may be of various shapes (see 1.2.2.1 to 1.2.2.5); the cross-sectional dimensions are constant along the length with wider tolerances than those of the corresponding flat or long products and side corners more or less rounded. The side surfaces are sometimes slightly convex or concave, retaining rolling, forging, or continuous casting marks and may be partly or totally dressed to remove surface defects, e.g. by cutting, flame melting, or grinding.

1.2.2.1

semi-finished product of square cross section

semi-finished product with sides of 50 mm or over, generally described as blooms if the sides are greater than 200 mm or as billets if smaller

Note 1 to entry: These dimensions may be less for certain types of steel, e.g. high-speed steels.

1.2.2.2

semi-finished product of rectangular cross section

semi-finished product of cross-sectional area of 2 500 mm² or over of width up to twice the thickness, generally described as blooms if the cross-sectional area is greater than 40 000 mm² or as billets if smaller

1.2.2.3

flat semi-finished product

product with a thickness of at least 50 mm and a width of at least twice the thickness, described as a slab

1.2.2.4

round semi-finished product

continuously cast or forged semi-finished product of circular cross section

1.2.2.5

blank for sections

semi-finished product intended for the manufacture of sections that have been preformed for that purpose

Note 1 to entry: The cross-sectional area is generally over 2 500 mm².

Note 2 to entry: In many countries, long products are obtained by rolling semi-finished products of square or rectangular cross sections.

1.2.2.6

blank for tubes and pipes

semi-finished product, usually shaped as round bars, intended for the manufacture of tubes and pipes that have been preformed for that purpose

1.2.2.7

VAR ingot

semi-finished product, usually shaped as round ingots or blooms, obtained by melting press-formed metallic raw material or by remelting ingots or blooms using a vacuum arc remelting (VAR) furnace

Note 1 to entry: Vacuum arc remelting results in products with improved chemical homogeneity and inclusion cleanliness.

1.2.2.8

ESR ingot

semi-finished product, usually shaped as round ingots or blooms, obtained by melting press-formed metallic raw material or by remelting ingots or blooms using an electro slag remelting (ESR) furnace

Note 1 to entry: Use of electro slag remelting results in products with improved chemical homogeneity and inclusion cleanliness.

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1.3 Flat products

1.3.1

flat product

product having approximately rectangular cross sections, the width being much greater than the thickness

Note 1 to entry: The surfaces are generally smooth except for certain products, e.g. floor plates, that show regular raised or indented surface patterns.

1.3.2

uncoated flat product

flat product without any coating or surface treatment

Note 1 to entry: Flat products that have received a simple coating for the purpose of protection from corrosion or mechanical damage, e.g. passivation, organic coatings, paper, oil, and lacquer, are defined as uncoated flat products.

1.3.2.1

hot-rolled uncoated flat product

flat product manufactured by hot rolling semi-finished products or by hot rolling ingots

Note 1 to entry: Hot-rolled flat products include those that have been subjected to a light cold-rolling pass, normally less than 5 % reduction, known as a "skin pass" or "dressing pass".

1.3.2.1.1

wide flat

flat product of width over 150 mm up to and including 1 250 mm and thickness generally over 4 mm, supplied in lengths, i.e. not coiled, and the edges are square, i.e. hot-rolled on the four sides (or in box passes)

1.3.2.1.2

hot-rolled sheet and plate

hot-rolled flat product, the edges of which are allowed to deform freely, supplied flat and generally in square or rectangular shapes with a width of 600 mm or over; but also in any other shape, e.g. circular or according to a drawing showing the product shape

Note 1 to entry: The edges may be as rolled or sheared, flame cut or chamfered. The product may also be delivered pre-curved. Hot-rolled sheet and plate are defined as:

- a) sheet: thickness less than 3 mm;
- b) plate: thickness 3 mm or over.

Note 2 to entry: Sheet and plate may be produced

- a) directly on a reversing mill (this product is generally known as quarto plate) or by cutting from a parent plate rolled on a reversing mill, and
- b) by cutting from a hot-rolled wide strip (this product is generally known as hot-rolled sheet or plate).

1.3.2.1.3

hot-rolled strip

hot-rolled flat product that immediately after the final rolling pass or after pickling or continuous annealing, is wound into a regular coil

Note 1 to entry: As-rolled strip has slightly convex edges, but may also be supplied with sheared edges or slit from wider strip.

Note 2 to entry: Hot-rolled strip is further defined as:

- a) hot-rolled wide strip: width 600 mm or over;
- b) hot-rolled slit wide strip: rolling width 600 mm or over, slit to widths less than 600 mm;
- c) hot-rolled narrow strip: rolling width less than 600 mm.

Note 3 to entry: After decoiling and transverse cutting, hot-rolled strip may be supplied as cut lengths or sheets.

1.3.2.2

cold-rolled uncoated flat product

uncoated flat product that have undergone a reduction in cross section of 25 % or over by cold rolling

Note 1 to entry: For flat products of rolling width less than 600 mm and for certain qualities of special steel, levels of reduction of cross-sectional area less than 25 % may be included.

1.3.2.2.1

cold-rolled sheet and plate

cold-rolled flat product, the edges of which are allowed to deform freely, supplied flat and generally in square or rectangular shapes with a width of 600 mm or over, but also in any other shape, e.g. circular or according to a drawing showing the product shape

Note 1 to entry: Cold-rolled sheet and plate are defined as:

- a) sheet: thickness less than 3 mm;
- b) plate: thickness 3 mm or over.

Note 2 to entry: The edges may be as rolled, sheared, flame cut, or chamfered.

1.3.2.2.2

cold-rolled strip

cold-rolled flat product that immediately after the final rolling pass, or after pickling or annealing, is wound into a regular coil

Note 1 to entry: As-rolled strip has slightly convex edges, but may also be supplied with sheared edges or slit from wider strip.

Note 2 to entry: Cold-rolled strip is further defined as: [ISO 6929:2013](https://standards.iteh.ai/catalog/standards/sist/3eeba6ea-1d04-402b-9b64-5f44fa870054/iso-6929-2013)

- a) cold-rolled wide strip: width 600 mm or over;
- b) cold-rolled slit wide strip: rolling width 600 mm or over, slit to widths less than 600 mm;
- c) cold-rolled narrow strip: rolling width less than 600 mm.

Note 3 to entry: After decoiling and cutting to length, cold-rolled strip may be supplied as cut lengths or sheets.

1.3.3

electrical steel

steel characterized by its magnetic properties, that is intended for use in magnetic circuits in electrical machines

Note 1 to entry: Electrical steels are supplied in the form of cold-rolled sheet or strip, generally less than 2 mm thick and width of up to and including 1 500 mm.

Note 2 to entry: There are also certain hot-rolled flat products with thicknesses of 1,5 mm up to 5 mm with specified mechanical and magnetic properties.

Note 3 to entry: Electrical steels are defined by the following specified principal magnetic properties:

- a) specific total loss in mass per kilogram at a specified level of peak magnetic flux density, T , and frequency, f , expressed in hertz;
- b) peak magnetic flux density, T , at a specified level of peak magnetic field strength expressed in amperes per metre and frequency expressed in hertz.

Note 4 to entry: Electrical steels are further defined in [1.3.3.1](#) and [1.3.3.2](#).

1.3.3.1**non-oriented grain electrical steel**

non-alloy steel and steel alloyed with silicon or silicon and aluminium that is essentially isotropic in its magnetic properties, i.e. the magnetic properties are similar both in the direction of rolling and in the transverse direction

Note 1 to entry: These steels may be supplied either

- a) in the semi-processed state with the required specific total loss achieved after the material has been annealed by the user according to a reference heat treatment, or
- b) in the final annealed state with specific total loss. The product may be supplied uncoated or with an insulating coating on one or both surfaces.

1.3.3.2**grain-oriented electrical steel**

steel alloyed with silicon that is anisotropic in that it possesses a metallurgical structure that gives preferential magnetic properties in the direction of rolling

Note 1 to entry: These steels are supplied with an insulating coating on both surfaces.

1.3.4**tin mill and allied products for packing**

non-alloy low carbon steel supplied in strip or sheet form, normally coated with tin or electrolytic chromium/chromium oxide for packaging purposes

Note 1 to entry: This includes the products listed in 1.3.4.1 to 1.3.4.4.

1.3.4.1**blackplate**

non-alloy, low carbon steel supplied in strip or sheet form that has been single or double cold reduced

Note 1 to entry: Single cold-reduced blackplate is commonly supplied with a thickness of 0,15 mm up to and including 0,60 mm, double cold-reduced blackplate with a thickness 0,14 mm up to and including 0,36 mm.

Note 2 to entry: Blackplate is normally used to manufacture tinplate or electrolytic chromium-coated sheet (ECCS), but blackplate may be used as such for some packaging applications. In such a case, the product should be suitable for varnishing (lacquering) or printing.

1.3.4.2**tinplate**

non-alloy, low carbon steel supplied in strip or sheet form that has been single or double cold reduced and coated on both surfaces with tin in a continuous electrolytic process

Note 1 to entry: Single-reduced tinplate is commonly supplied with a thickness of 0,15 mm up to and including 0,60 mm, double-reduced tinplate with a thickness of 0,14 mm up to and including 0,36 mm. Tinplate is supplied normally with a passivation treatment and a protective coating of oil and is suitable for varnishing (lacquering) or printing.

Note 2 to entry: Tinplate may also be obtained by hot dipping in a bath of molten tin.

1.3.4.3**tinned sheet and strip**

non-alloy, low carbon steel supplied in strip or sheet form of a thickness of 0,50 mm or over and tin coated on both surfaces

1.3.4.4
electrolytic chromium-/chromium oxide-coated steel
ECCS

non-alloy, low carbon steel supplied in strip or sheet form that may have been single or double cold reduced; coated on both surfaces by a cathodic process with a duplex film of metallic chromium adjacent to the steel substrate with an outer layer of hydrated chromium oxide or hydroxide

Note 1 to entry: Single cold-reduced ECCS is commonly supplied with a thickness of 0,17 mm up to and including 0,49 mm, double cold-reduced ECCS with a thickness of 0,14 mm up to and including 0,29 mm. ECCS is supplied normally with a protective coating of oil and is suitable for varnishing (lacquering) or printing.

1.3.5
coated hot-rolled or cold-rolled flat product

hot-rolled or cold-rolled product with a permanent coating other than those defined in [1.3.2](#), [1.3.3](#), or [1.3.4](#), whether

- a) on both surfaces of
 - 1) equal thickness, or
 - 2) different thickness (differential coating), or
- b) on one surface only

Note 1 to entry: Coating masses and coating thicknesses cited in the following subclauses are nominal and relate to the current technology.

Note 2 to entry: According to the type of coating, the products are classified in [1.3.5.1](#) to [1.3.5.3](#).

1.3.5.1
metal-coated sheet and strip

sheet and strip coated with metallic material such as aluminium, zinc, silicon, etc.

Note 1 to entry: According to the type of coating process, the products are classified in [1.3.5.1.1](#) and [1.3.5.1.2](#).

1.3.5.1.1
hot-dipped metal-coated sheet and strip

flat products that has been metal coated by hot dipping in a molten bath, described by reference to the total coating mass, expressed in grams per square metre

Note 1 to entry: This includes the products listed in [1.3.5.1.1.1](#) to [1.3.5.1.1.4](#).

1.3.5.1.1.1
zinc-coated sheet and strip (hot-dipped sheet and strip, galvanized sheet and strip)

hot-dipped metal sheet and strip coated with zinc

Note 1 to entry: The total mass of the zinc varies in general between 60 g/m² and 700 g/m². The coatings may have a spangle finish or be without spangle. After zinc coating, the surfaces may be passivated by chromating, phosphating, or treatment with compounds of vanadium or titanium or both. This final surface treatment does not alter the definition of such products as "hot-dipped zinc-coated flat products".

1.3.5.1.1.2
aluminium-zinc coated sheet and strip

hot-dipped metal sheet and strip coated with aluminium

Note 1 to entry: The total mass of the alloy varies in general between 80 g/m² and 450 g/m².

Note 2 to entry: According to the aluminium content, a distinction is made between

- a) aluminium-zinc alloys (aluminium 50 % or over), and
- b) zinc-aluminium alloys (aluminium over 3 % but less than 50 %).

1.3.5.1.1.3**aluminium or aluminium-silicon alloy coated sheet and strip**

hot-dipped metal sheet and strip coated with aluminium or aluminium-silicon

Note 1 to entry: The total mass of the alloy varies in general between 40 g/m² and 300 g/m².

1.3.5.1.1.4**lead-tin alloy coated sheet and strip
terne plate**

sheet and strip coated with a lead-tin alloy

Note 1 to entry: In general, the highest nominal mass for the coating corresponds to a minimum of 120 g/m² including both surfaces.

1.3.5.1.2**electrolytically metal-coated sheet and strip**

flat products metal coated electrolytically, described by reference to the single surface coating thickness in micrometres

Note 1 to entry: This includes the products listed in [1.3.5.1.2.1](#) to [1.3.5.1.2.3](#).

1.3.5.1.2.1**electrolytically zinc-coated sheet and strip (electrozinc sheet)**

sheet and strip coated electrolytically with zinc with coating thickness generally between 1 µm and 10 µm on each surface

Note 1 to entry: This coating does not show a spangle finish. After zinc coating, the surfaces may be passivated by chromating, phosphating, or treatment with compounds of vanadium and/or titanium. This final surface treatment does not alter the definition of such products as "electrolytically zinc-coated flat products".

1.3.5.1.2.2**electrolytically zinc-nickel coated sheet and strip**

sheet and strip coated electrolytically with zinc-nickel alloy with coating thickness generally between 1 µm and 8,5 µm on each surface

1.3.5.1.2.3**electrolytically lead-tin coated sheet and strip**

sheet and strip coated electrolytically with a lead-tin alloy with coating thickness generally between 2,5 µm and 10 µm on each surface

1.3.5.2**sheet and strip with organic coatings**

uncoated or metal-coated (e.g. zinc-coated) sheet and strip, subsequently coated with an organic material or a mixture of metal powder and organic material by one of the following continuous processes:

- a) by the application of one or more coats of paint or other type of product;

Note 1 to entry After drying, the thickness of the coating varies according to its characteristics from 2 µm to 400 µm on each surface.

- b) by the application of an adhesive film whether or not followed by a coating of organic materials

Note 1 to entry The coating may have different surface patterns and a thickness generally between 35 µm to 500 µm on each surface.

1.3.5.3**sheet and strip with miscellaneous inorganic coatings**

sheet and strip coated with an inorganic material, e.g. vitreous enamel

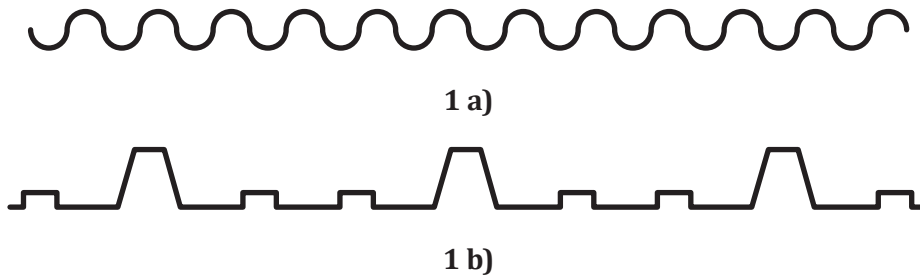
**1.3.6
profiled sheet**

sheet usually manufactured from coated sheet, but also from uncoated sheet, with a width much greater than the height of the profile

Note 1 to entry: See [Figure 1](#).

Note 2 to entry: A distinction is made between

- a) corrugated sheet: products showing large or small longitudinal corrugations, mainly used for cladding, flooring, and roofing [[Figure 1 a](#)], and
- b) ribbed sheet: products with rectangular or trapezoidal longitudinal ribs [[Figure 1 b](#)].

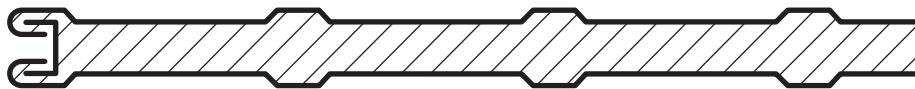


**Figure 1 — Illustration of typical profiled sheet
(see 1.3.6)**
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**1.3.7
composite products**
products comprising

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- a) plate, sheet, and strip clad with steels or alloys to resist wear, chemical corrosion, or heat distortion; bonding is usually achieved by rolling, spraying, welding, or explosion,
- b) sandwich steel sheet formed from two sheets bonded together by means of a synthetic sound insulating plastic layer, or
- c) sandwich panels fabricated from two ribbed sheets bonded by an insulating layer (See [Figure 2](#))



**Figure 2 — Illustration of typical sandwich panel
[see 1.3.7 c)]**

1.4 Long products

1.4.1

long product

product that does not conform to the definition of a *flat product* ([1.3.1](#))

Note 1 to entry: Long products have a constant cross section that is usually defined by a standard that establishes the normal size ranges and the tolerances on shape and dimensions. The surface is generally smooth, but in certain cases, e.g. reinforcing bars, may have a regularly raised or indented pattern.

1.4.2

rod

hot-rolled long product having a nominal size generally of 5 mm or above and wound into irregular coils

Note 1 to entry: The cross section may be round, oval, square, rectangular, hexagonal, octagonal, half round, or of any similar shape. Its surface is smooth. Rod is generally intended to undergo further processing. It may also be used with or without further processing, e.g. cold deforming, for the fabrication of welded fabric or for other elements used to reinforce concrete.

Note 2 to entry: Rod used for wire drawing purposes in coil form is generally named “wire rod”.

1.4.3

wire

product of constant cross section along its length, obtained by cold drawing rod through a reducing die or passing under pressure between rollers and rewinding the drawn product

Note 1 to entry: The cross section is generally round, though sometimes oval, rectangular, square, hexagonal, octagonal, or other convex section. **(standards.iteh.ai)**

Note 2 to entry: The manufacturing processes provide close control of geometric (size, surface condition) and mechanical properties. Wire may be supplied ~~uncoated~~ (as drawn, annealed) or coated (e.g. with zinc, copper, nickel, or plastic materials). **(standards.iteh.ai/catalog/standards/sist/3eeba6ea-1d04-402b-9b64-3f44fa870054/iso-6929-2013)**

Note 3 to entry: Heat treatments or surface treatments or both may be applied during the course of manufacture to improve the properties of wire.

Note 4 to entry: Wire is often confused with rod. To avoid confusion, wire can be more specifically called “drawn wire” [especially when passed through reducing die(s)] and rod more specifically called “wire rod”.

1.4.4

hot-finished bar

product supplied in straight lengths but not in coils, thus differentiating them from rod

1.4.4.1

hot-rolled bar

hot-rolled product in straight lengths of constant transverse section having a solid (convex) cross section as defined in [1.4.4.1.1](#) to [1.4.4.1.3](#)

1.4.4.1.1

round bar

bar having a circular cross section of diameter generally 8 mm or over

1.4.4.1.2

square, hexagon, and octagon bar

bar having square, hexagonal, or octagonal cross section; the side is generally 8 mm or over for squares or 13 mm or over for hexagons

Note 1 to entry: Squares of sides up to 50 mm with rounded corners are considered to be square bars.