
Steel sheet, aluminium-silicon alloy-coated by the continuous hot-dip process, of commercial and drawing qualities

Tôles en acier au carbone laminées à froid, revêtues par immersion à chaud en continu d'une couche d'aluminium-silicium, de qualité commerciale et pour emboutissage

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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 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 12, *Continuous mill flat rolled products*.

This fifth edition cancels and replaces the fourth edition (ISO 5000:2011), which has been technically revised. The main changes compared to the previous edition are as follows:

— editorial updates throughout for clarity.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Steel sheet, aluminium-silicon alloy-coated by the continuous hot-dip process, of commercial and drawing qualities

1 Scope

This document is applicable to the minimum requirements for steel sheet, in coils and cut lengths, metallic-coated by the continuous hot-dip process, with aluminium-silicon alloy coating.

The product is intended for heat-resisting applications and also where both corrosion and heat resistance are required.

The steel sheet is produced in a number of quality designations and grades, coating mass, surface treatments and coating finish conditions to be compatible with differing application requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6353 (all parts), *Reagents for chemical analysis*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 7438, *Metallic materials — Bend test*

ISO 16163, *Continuously hot-dipped coated steel sheet products — Dimensional and shape tolerances*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

commercial

base-metal quality intended for general fabricating purposes where sheet is used in the flat condition, or for bending or moderate forming

3.2

drawing

base-metal quality intended for parts where drawing or severe forming may be involved

3.3

deep drawing

base-metal quality intended for parts where severe forming or severe drawing may be involved

3.4

deep drawing aluminium killed

base-metal quality intended for fabricating parts where particularly severe drawing or forming may be involved

3.5

extra-deep drawing stabilized

base-metal quality intended for applications where maximum formability is required by applying interstitial free steel

3.6

interstitial free steel

IF steel

extra-low-carbon steel in which all interstitial elements are combined with titanium and/or equivalent elements

Note 1 to entry: Interstitial free steel is sometimes referred to as stabilized steel.

3.7

differential coating

coating deliberately produced to have a different *coating mass* (3.9) on each surface

3.8

breakage allowance

agreed upon level of acceptable die breakage not subject to claim

3.9

coating mass

total amount of coating on both sides of the sheet, expressed in grams per square metre

3.10

normal spangle

coating formed as a result of the unrestricted growth of aluminium-silicon alloy crystals during normal solidification

3.11

skin pass

light cold rolling of the product

Note 1 to entry: The purpose of the skin passing is one or more of the following: to minimize the appearance of coil breaks, stretcher strains and fluting; to control the shape; and to obtain the required surface finish.

Note 2 to entry: Some increase in hardness and some loss in ductility will result from skin passing.

3.12

lot

up to a specified quantity of steel sheet of the same designation rolled to the same thickness and coating condition

3.13

smooth finish

smoothness produced by skin-passing the coated material in order to achieve an improved surface condition as compared with the normal as-coated product

4 Dimensions

4.1 Aluminium-silicon alloy-coated steel sheet is produced in thicknesses from 0,40 mm to 3,0 mm inclusive and in widths of 600 mm to 1 500 mm in coils and cut lengths. Aluminium-silicon alloy-coated sheet less than 600 mm wide, slit from wide sheet, is considered as sheet.

4.2 The thickness of aluminium-silicon alloy-coated steel sheets may be specified as a combination of the base metal and metallic coating, or as base metal alone. The purchaser shall indicate on the order which method of specifying thickness is required. In the event that the purchaser does not indicate any preference, the thickness as a combination of the base metal and coating will be provided. [Annex A](#) describes the requirements for specifying the thickness as base metal alone.

5 Conditions of manufacture

5.1 Steelmaking

Unless otherwise agreed by the interested parties, the processes used in making the steel and in manufacturing aluminium-silicon alloy-coated sheet are left to the discretion of the manufacturer. On request, the purchaser shall be informed of the steelmaking process being used.

5.2 Chemical composition

The chemical composition (heat analysis) shall conform to the requirements given in [Tables 1](#) and [2](#).

5.3 Chemical analysis

5.3.1 Heat analysis

An analysis of each heat shall be made by the manufacturer in order to determine conformity with the requirements given in [Tables 1](#) and [2](#). On request, a report of the heat analysis shall be made available to the purchaser or the purchaser's representative. Each of the elements listed in [Tables 1](#) and [2](#) shall be included in the report of the heat analysis. When the amount of copper, nickel, chromium or molybdenum present is less than 0,02 %, the analysis may be reported as "<0,02%".

5.3.2 Product analysis

A product analysis may be made by the purchaser in order to verify the specified analysis of the product and shall take into consideration any normal heterogeneity. The product analysis shall be in accordance with [Tables 2](#) and [3](#).

Table 1 — Chemical composition (heat analysis)

Mass fractions in percent

Base-metal quality		C	Mn	P	S	Ti
Designation	Name	max.	max.	max.	max.	max.
01	Commercial	0,15	0,60	0,05	0,035	—
02	Drawing	0,10	0,50	0,04	0,035	—
03 ^a	Deep drawing	0,08	0,45	0,03	0,03	—
04 ^a	Deep drawing aluminium killed	0,06	0,45	0,03	0,03	—
05 ^a	Extra-deep drawing stabilized	0,02	0,25	0,02	0,02	0,15

^a Interstitial free steel may be applied (see [5.4.3](#)).

Table 2 — Limits on additional chemical elements

Mass fractions in percent

Element	Cu ^a max.	Ni ^a max.	Cr ^{ab} max.	Mo ^{ab} max.	Nb ^c max.	V ^{c,d} max.	Ti ^c max.
Heat analysis	0,20	0,20	0,15	0,06	0,008	0,008	0,008
Product analysis	0,23	0,23	0,19	0,07	0,018	0,018	0,018
^a The sum of copper, nickel, chromium and molybdenum shall not exceed 0,50 % on heat analysis. When one or more of these elements are specified, the sum does not apply, in which case only the individual limits on the remaining elements apply. ^b The sum of chromium and molybdenum shall not exceed 0,16 % on heat analysis. When one or more of these elements are specified, the sum does not apply, in which case, only the individual limits on the remaining elements apply. ^c For interstitial free steels only, the value of 0,15 % titanium, and 0,10 % maximum for niobium and vanadium are acceptable to ensure that the carbon and nitrogen are fully stabilized. ^d Heat analysis greater than 0,008 % may be supplied after agreement between producer and purchaser.							

Table 3 — Product analysis tolerances for Table 1

Mass fractions in percent

Element	Maximum of specified element	Tolerance over maximum specified
C	0,02	0,01
	0,15	0,03
Mn	0,60	0,03
P	0,05	0,01
S	0,035	0,01
NOTE The above maximum tolerance is the allowable excess over the requirement of heat analysis shown in Table 1.		

5.4 Mechanical properties

5.4.1 Ordering conditions

Aluminium-silicon alloy-coated steel sheet of designations 02 and 03 are supplied under either of the following two ordering conditions.

- Ordering condition A: steel sheet mechanical properties shall, at the time the steel is made available for shipment, satisfy the applicable requirements of Table 4, when they are determined on test pieces obtained in accordance with the requirements in Clause 7. The values specified in Table 4 are applicable for the periods indicated in Table 5 from the time that the steel is available for shipment.
- Ordering condition B: steel sheet, ordered to make an identified part, shall be supplied with a commitment for satisfactory manufacturing performance within an established breakage allowance which shall be previously agreed upon by the interested parties. In the agreement, the part name, the details of fabrication, and special requirements (such as freedom from stretcher strain or fluting) shall be specified.

In the case of ordering condition B, mechanical properties of the steel sheet may also be agreed upon by the interested parties and such properties may not necessarily satisfy the requirements of Table 4.

5.4.2 Fabrication qualities

Aluminium-silicon alloy-coated steel sheets are available in several fabrication qualities: commercial, drawing, deep drawing, deep drawing aluminium killed and extra-deep drawing stabilized.

5.4.3 Interstitial free steel

Stabilized interstitial free (IF) steel is applicable to orders for designations 03, 04 and 05; provided that the purchaser is informed of the substitution and that related shipping documents reflect the actual material shipped.

Table 4 — Mechanical properties

Base-metal quality		R_{eL} max. ^a	R_m max. ^b	A min. ^c %		$\bar{r}$ min. ^{def}	$\bar{n}$ min. def
Designation	Name	MPa	MPa	$L_0 = 80 \text{ mm}$	$L_0 = 50 \text{ mm}$		
01	Commercial	—	—	—	—	—	—
02	Drawing	340	430	30	31	—	—
03	Deep drawing	300	410	34	35	—	—
04	Deep drawing aluminium killed	270	410	36	37	—	—
05	Extra-deep drawing stabilized	250	380	38	38	1,4	0,17

R_{eL} = lower yield strength
 R_m = tensile strength
 A = percentage elongation after fracture
 L_0 = gauge length of original test piece
 $\bar{r}$ = index of drawability of the product
 $\bar{n}$ = index of stretchability of the product
1 MPa = 1 N/mm²

NOTE 1 For products produced according to performance criteria (ordering condition B), the typical mechanical properties presented here are non-mandatory. For products specified according to mechanical properties (ordering condition A), the purchaser may negotiate with the manufacturer if a specific range, or a more restrictive range, is required for the application. When agreed to, such values may be specified.

NOTE 2 With the exception of footnote c and d; these typical mechanical properties apply to the full range of steel sheet thicknesses. The yield strength tends to increase and some of the formability tends to decrease as the sheet thickness decreases.

a The values apply to 0,2 % proof strength when a definite yield phenomenon is not present, otherwise to the lower yield strength (R_{eL}).

b The minimum tensile strength for qualities 02, 03 and 04 would normally be expected to be 270 MPa. For design purposes, the lower limit for R_{eL} may be assumed to be 140 MPa for grades 01, 02, 03, 04, and 120 MPa for grade 05. All tensile strength values are determined to the nearest 10 MPa.

c For materials of thickness up to and including 0,6 mm, the elongation percentages in this table shall be reduced by 2.

d $\bar{r}$ and $\bar{n}$ values are only applicable to thickness $\geq 0,5 \text{ mm}$. For thickness $> 2,0 \text{ mm}$, the $\bar{r}$ value is reduced by 0,2.

e $\bar{r}$ can also be written as r -bar and $\bar{n}$ can also be written as n -bar.

f $\bar{r}$ and $\bar{n}$ values may be modified or excluded from this specification, by agreement between the producer and the purchaser.

Table 5 — Applicable period for values specified in Table 4

Designation	Period
01	Not applicable
02	8 days
03	30 days
04	6 months
05	6 months

5.5 Coating

5.5.1 Silicon content

The aluminium-silicon alloy used for coating normally has between 5 % and 11 % silicon added to promote better adherence and heat resistance.

5.5.2 Coating mass

The coating mass limits shall conform to the limits for the designations shown in Table 6. The coating mass is the total amount of coating on both sides of the sheet, expressed in grams per square metre. The interested parties shall agree upon the coating mass of differentially coated products. If a maximum coating mass is required, the manufacturer shall be notified at the time of ordering.

5.5.3 Coating adherence

Aluminium-silicon alloy-coated steel sheet shall be capable of being bent in any direction, in accordance with the mandrel diameter requirements of Table 7, without flaking of the coating on the outside of the bend. Flaking of the coating within 7 mm from the edge of the test piece shall not be a cause for rejection.

Table 6 — Coating mass (total both sides)

Coating mass designation	Minimum check limit	
	Triple-spot test g/m ²	Single-spot test g/m ²
AS040	40	30
AS060	60	45
AS080	80	60
AS100	100	75
AS120	120	90
AS150	150	115
AS200	200	150
AS300	300	240

NOTE 1 Because of the many variables and changing conditions that are characteristic of continuous aluminium-silicon coating, the coating mass is not always evenly divided between the two surfaces of an aluminium-silicon-coated sheet; neither is the aluminium-silicon coating evenly distributed from edge to edge. However, it can normally be expected that not less than 40 % of the single-spot check limit will be found on either surface.

NOTE 2 The coating thickness can be estimated from the coating mass by using the following relationship: 100 g/m² total mass both sides $\cong$ 0,033 mm total thickness both sides.

Table 7 — Coating adherence — Bend test mandrel diameter

Base-metal quality		Coated metal – 180° bend mandrel diameter, mm					
Designation	Grade	Coating designation					
		$e < 1,25$			$e \geq 1,25$		
		Up to AS120	AS150	AS200 AS300	Up to AS120	AS150	AS200 AS300
01	Commercial	1a	2a	2a	2a	3a	3a
02, 03, 04, and 05	Drawing	1a	2a	—	3a	3a	—

a = thickness of bend-test piece, in millimetres
 e = thickness of steel sheet, in millimetres

5.6 Weldability

The product is suitable for welding if appropriate welding conditions are selected with special attention to the heavier coatings.

5.7 Coating finish condition

The coating finish of aluminium-silicon alloy-coated steel sheet is either a normal, as-coated surface with unrestricted spangle growth, or a skin passed, surface that has improved smoothness compared to an as-coated surface.

5.8 Surface treatment

5.8.1 Mill passivation

A chemical treatment is normally applied to aluminium-silicon alloy-coated steel sheet to minimize the hazard of wet-storage staining during shipment and storage. However, the inhibiting characteristics of the treatment are limited and if a shipment is received wet, the material shall be used immediately or dried.

5.8.2 Oiling

When specified, aluminium-silicon alloy-coated steel sheet as produced shall be oiled to prevent marring and scratching of the soft surface during handling or shipping and to minimize wet storage stain.

NOTE When aluminium-silicon alloy-coated steel sheet has received a passivating treatment, oiling will further minimize the hazard of wet storage stain.

5.9 Coated coil joining

Continuous coil coating lines use various methods to join coil ends. These methods include lap welding, butt welding, and stitching. The shipment of coils containing the joined coil ends shall be permitted if agreed upon between the purchaser and manufacturer.

5.10 Dimensional and shape tolerances

5.10.1 Dimensional and shape tolerances applicable to aluminium-silicon alloy-coated steel sheet shall be as specified in ISO 16163. The tolerances for thickness apply to products whose thickness is a combination of base metal and coating thickness.

5.10.2 When base metal thickness is specified, the thickness tolerances of ISO 16163 shall apply to the product thickness calculated in accordance with [Annex A](#).

6 Sampling

6.1 Tensile test

When required, one representative transverse sample from each lot of 50 t or less for shipment shall be taken for the tensile test to verify conformity with the requirements of [Table 4](#).

6.2 Coating tests

6.2.1 Coating mass

6.2.1.1 The producer shall develop a testing plan with a frequency sufficient to adequately characterize the lot of material and to ensure conformity with specification requirements.

6.2.1.2 The purchaser may conduct verification tests by securing a sample piece of approximately 300 mm in length by the as-coated width, and cutting three test specimens, one from the mid-width position and one from each side, not closer than 25 mm to the side edge. The minimum area of each specimen shall be 1 200 mm².

6.2.2 Triple-spot test

The triple-spot test result shall be the average coating mass found on the three specimens taken in accordance with [6.2.1](#).

6.2.3 Single-spot test

The single-spot test result shall be the minimum coating mass found on any one of the three specimens used for the triple-spot test. Material that has been slit from wide coil shall be subject to a single-spot test only.

6.2.4 Coating adherence

One representative sample for the coating-adherence bend test shall be taken from each lot of 50 t or less for shipment. The specimens for the coated bend test shall be taken not closer than 25 mm from the side edge. The minimum width of the test specimen shall be 50 mm.

7 Test methods

7.1 Tensile test

The tests shall be conducted in accordance with the methods specified in ISO 6892-1. Transverse test pieces shall be taken mid-way between the centre and the edge of the as-coated sheet. The base-metal thickness shall be used to calculate the cross-sectional area needed for the tensile test; however, for orders specifying thickness "as base metal only", there are two permissible methods for determining the base-metal thickness.

- a) Option A — Determination of the actual base-metal thickness through direct measurement of the substrate of a specimen where the coating has been removed.
- b) Option B — Calculation of the base-metal thickness, by subtraction of the equivalent coating thickness for the appropriate coating designation included in [Annex A](#) from the actual coated thickness of the test specimen.

7.2 Coating properties

7.2.1 Coating mass

The manufacturer shall conduct tests using methods deemed necessary to ensure that the material conforms with the requirements shown in [Table 6](#). Determination of coating mass shall be conducted in accordance with either one of the two methods described in [Annex B](#).

7.2.2 Coating adherence

Bend tests shall be conducted in accordance with the methods specified in ISO 7438.

8 Designation system

8.1 General

The designation system includes the coating name, coating mass, coating finish condition, surface treatment and base-metal quality.

8.2 Coating designation

The letters AS are used to indicate the aluminium-silicon alloy coating.

8.3 Coating mass

8.3.1 The coating mass designations are AS040, AS060, AS080, AS100, AS120, AS150, AS200 and AS300, as indicated in [Table 6](#).

8.3.2 The coating is expressed as the total mass on both surfaces, in grams per square metre. The coating mass specified should be compatible with the desired service life, the thickness of the base metal, and with the forming requirements involved.

NOTE For differential coatings, the coating mass of each surface, which is based on the agreement of the interested parties, is shown in the order of top surface and bottom surface. An example of a differential coating designation is AS200080NC02 (see [8.7.2](#)).

8.4 Coating finish condition

The coating finish condition designations are as follows:

- N: as coated finish, no skin pass;
- S: smooth finish with skin pass.

NOTE 1 The normal spangle is the “as-coated” condition and the smooth finish is achieved with a skin pass.

NOTE 2 End-use applications can require negotiation between the supplier and the consumer to establish specific surface requirements.

8.5 Surface treatment

The surface treatment designations are as follows:

- C: mill passivation;
- O: oiling;
- CO: mill passivation and oiling.

8.6 Base-metal quality

The base-metal quality designations are as follows:

- 01: commercial quality;
- 02: drawing quality;
- 03: deep drawing quality;
- 04: deep drawing aluminium killed quality;
- 05: extra-deep drawing stabilized quality.

8.7 Examples

8.7.1 An example of a complete designation is AS080SC01. This designation is obtained by combining the following components:

- AS: aluminium-silicon alloy coating;
- 080: coating mass;
- S: skin passed;
- C: mill passivation;
- 01: commercial quality.

8.7.2 An example for differential coatings is AS200080NC02. The standard designation would give the top surface before the bottom surface. This designation is obtained by combining the following components:

- AS: aluminium-silicon alloy coating;
- 200: coating mass top surface;
- 080: coating mass bottom surface;
- N: as coated finish, no skin pass;
- C: mill passivation;
- 02: drawing quality.

9 Retests

9.1 Machining and flaws

If any tensile test piece shows defective machining or develops flaws, it shall be discarded, and another test piece shall be substituted.

9.2 Elongation

On any tensile test, if any part of the fracture is outside the middle half of the gauge length as scribed before the test, the test shall be discarded, and a retest carried out.

9.3 Additional tests

If any test does not give the specified results, two additional tests shall be conducted on samples selected at random from the same lot. Both retests shall conform to the requirements of this document; otherwise the lot shall be rejected.

10 Resubmission

10.1 The manufacturer may resubmit, for acceptance, the products that have been rejected during earlier inspection because of unsatisfactory properties, after the rejected products have been subjected to a suitable treatment (e.g. selection, heat treatment), which on request, will be indicated to the purchaser. In this case, the tests should be carried out as if they applied to a new lot.

10.2 The manufacturer may present the rejected products to a new examination for conformity with the requirements for another quality.

11 Workmanship

11.1 The surface condition shall be that normally obtained for an aluminium-silicon alloy-coated steel sheet product.

11.2 The steel sheet in cut lengths shall be free from quantities of laminations, surface flaws and other imperfections that are detrimental to the final product or to subsequent appropriate processing.

11.3 Processing for shipment in coils does not afford the manufacturer the opportunity to observe readily or to remove nonconforming portions, as can be carried out on the cut length product. However, it is the responsibility of the manufacturer to provide a product that meets the requirement for surface condition that is normally obtained on aluminium-silicon alloy-coated steel sheet products.

12 Inspection and acceptance

12.1 Although not usually required for products covered by this document, when the purchaser specifies that inspection and tests for acceptance shall be observed prior to shipment from the manufacturer's works, the manufacturer shall afford the purchaser's inspector all reasonable facilities to determine that the steel is being furnished in accordance with this document.

12.2 Steel that is reported to be nonconforming after arrival at the user's works shall be set aside, properly and correctly identified, and adequately protected. The manufacturer shall be notified in order that the reported nonconforming material may be properly investigated.

13 Coil size

When steel sheets in accordance with this document are ordered in coils, a minimum or range of acceptable inside diameter(s) (ID) shall be specified. In addition, the maximum outside diameter (OD) and the maximum acceptable coil mass shall be specified.

14 Marking

Unless otherwise stated, the following minimum requirements for identifying the steel shall be legibly stencilled on the top of each lift or shown on a tag attached to each coil or shipping unit:

- a) the manufacturer's name or identifying brand;

- b) the number of this document, i.e. ISO 5000:2019;
- c) the quality and grade designation;
- d) the coating designation;
- e) the order number;
- f) the product dimensions;
- g) the mass;
- h) the bundle or coil number.

15 Information to be supplied by the purchaser

To specify requirements adequately in accordance with this document, enquiries and orders shall include the following information:

- a) a reference to this document, i.e. ISO 5000:2019;
- b) the name and designation of the material, i.e. steel sheet, aluminium-silicon alloy-coated, coating mass, coating finish condition, surface treatment and base metal quality (see [Clause 8](#));
- c) dimensions: for cut lengths: thickness (combination of base metal and coating or base metal alone), width, length and bundle mass, and the total quantity required; for coils: thickness (combination of base metal and coating or base metal alone), width, minimum or range of inside diameter, outside diameter, and the maximum acceptable coil mass, and the quantity required;

NOTE 1 When the base metal alone is specified, see [Annex A](#).

NOTE 2 When the method of specifying thickness is not indicated, the combination of base metal and coating will be provided.

- d) the application (name of part), if available;

NOTE 3 Identification of the application provides the opportunity to assess the compatibility of the end use with the ordered quality and coating designation. Proper identification of the part can include a description of the part or a visual examination of a submitted part and/or prints, or any combination thereof.

- e) ordering condition A or B (see [5.4.1](#));
- f) coating finish condition (see [5.7](#));
- g) whether mill passivated or not (see [5.8.1](#));
- h) whether oiled or not (see [5.8.2](#));
- i) the report of heat analysis (see [5.3.1](#)) and mechanical properties, if required;
- j) inspection and tests for acceptance prior to shipment from the producer's works, if required (see [Clause 12](#)).

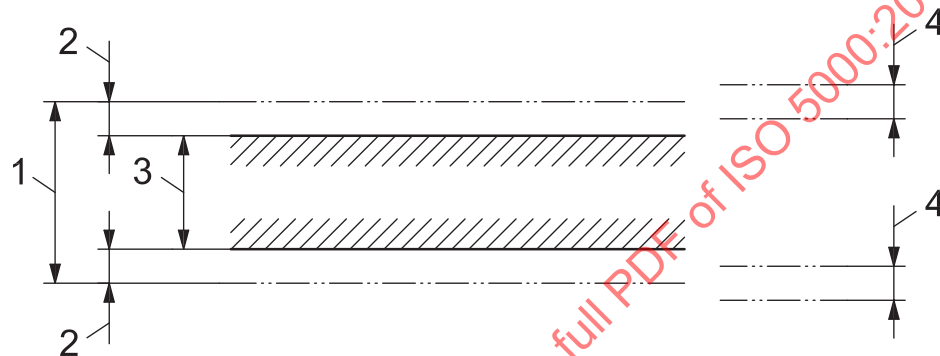
EXAMPLE An example of an ordering description is as follows:

ISO 5000:2019, steel sheet, aluminium-silicon alloy-coated, drawing quality, designation AS120S02, ordering condition A, 1,0 (base metal alone) × 1 200 mm × coil, 20 000 kg, exhaust pipe tubing, #6201.

Annex A (normative)

Orders requiring base-metal thickness

When specified by the purchaser, the ordered thickness shall be the base-metal thickness. In these cases, the product thickness shall be calculated as the base-metal thickness + the equivalent coating thickness for each surface (see [Table A.1](#)) of the coating, as indicated in [Figure A.1](#). Thickness tolerance tables apply to the product thickness.



Key

- 1 product thickness
- 2 equivalent coating thickness
- 3 base-metal thickness
- 4 thickness tolerance

Figure A.1 — Calculation of the product thickness

Table A.1 — Equivalent coating thickness – total both sides

Coating mass designation	Equivalent coating thickness for calculation mm
AS040	0,022
AS060	0,033
AS080	0,044
AS100	0,056
AS120	0,067
AS150	0,083
AS200	0,111
AS300	0,167