

---

---

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

*Tôles en acier revêtues en continu par immersion à chaud — Tolérances  
sur dimensions et forme*



**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

STANDARDSISO.COM : Click to view the full PDF of ISO 16163:2000

© ISO 2000

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.ch](mailto:copyright@iso.ch)  
Web [www.iso.ch](http://www.iso.ch)

Printed in Switzerland

## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 16163 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 12, *Continuous mill flat rolled products*.

STANDARDSISO.COM : Click to view the full PDF of ISO 16163:2000



# Continuously hot-dipped coated steel sheet products — Dimensional and shape tolerances

## 1 Scope

This International Standard applies to dimensional and shape tolerances for all continuously hot-dipped coated steel sheet products. If a conflict exists with another continuously hot-dipped coated steel sheet standard that standard shall prevail.

**Table 1 — Normal thickness tolerances for commercial, lock-forming, drawing, drawing aluminum-killed and extra deep drawing stabilized interstitial free quality coils and cut lengths**

Dimensions and tolerances in millimetres

| Specified width                                                                                                                                                                                                                                                                                                                        | Thickness tolerances <sup>a</sup><br>for specified thicknesses <sup>b, c</sup> |             |             |             |             |             |             |             |             |             |             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                                                                                                                                                                                                                                                                                                                                        | ≤ 0,4                                                                          | > 0,4 ≤ 0,6 | > 0,6 ≤ 0,8 | > 0,8 ≤ 1,0 | > 1,0 ≤ 1,2 | > 1,2 ≤ 1,6 | > 1,6 ≤ 2,0 | > 2,0 ≤ 2,5 | > 2,5 ≤ 3,0 | > 3,0 ≤ 4,0 | > 4,0 ≤ 5,0 |
| > 600<br>≤ 1 200                                                                                                                                                                                                                                                                                                                       | ± 0,05                                                                         | ± 0,06      | ± 0,08      | ± 0,09      | ± 0,10      | ± 0,12      | ± 0,18      | ± 0,19      | ± 0,21      | ± 0,23      | ± 0,25      |
| > 1 200<br>≤ 1 500                                                                                                                                                                                                                                                                                                                     | ± 0,06                                                                         | ± 0,07      | ± 0,09      | ± 0,10      | ± 0,11      | ± 0,13      | ± 0,20      | ± 0,22      | ± 0,23      | ± 0,25      | ± 0,27      |
| > 1 500<br>≤ 1 800                                                                                                                                                                                                                                                                                                                     | —                                                                              | ± 0,09      | ± 0,10      | ± 0,11      | ± 0,13      | ± 0,15      | ± 0,22      | ± 0,24      | ± 0,25      | ± 0,27      | ± 0,29      |
| NOTE Thicknesses up to 1,6 mm are generally produced with cold-rolled substrate.                                                                                                                                                                                                                                                       |                                                                                |             |             |             |             |             |             |             |             |             |             |
| <sup>a</sup> The thickness tolerances for sheet in coil form are the same as for sheet supplied in cut lengths but in cases where welds are present, the tolerances shall be double those given over a length of 15 m in the vicinity of the weld.                                                                                     |                                                                                |             |             |             |             |             |             |             |             |             |             |
| <sup>b</sup> Given the difference in tolerances and physical properties of hot rolled and cold rolled sheet products, the user and the supplier may negotiate a specific type of substrate. The relationship between coating mass in g/m <sup>2</sup> and the thickness in micrometres can be retrieved from the respective standards. |                                                                                |             |             |             |             |             |             |             |             |             |             |
| <sup>c</sup> Thickness is measured at any point on the sheet not less than 25 mm from a side edge.                                                                                                                                                                                                                                     |                                                                                |             |             |             |             |             |             |             |             |             |             |

Table 2 — Normal thickness tolerances for structural-quality coils and cut lengths

Dimensions and tolerances in millimetres

| Specified width                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Thickness tolerances <sup>a, b, c</sup><br>for specified thicknesses <sup>d, e</sup> |             |             |             |             |             |             |             |             |             |             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ≤ 0,4                                                                                | > 0,4 ≤ 0,6 | > 0,6 ≤ 0,8 | > 0,8 ≤ 1,0 | > 1,0 ≤ 1,2 | > 1,2 ≤ 1,6 | > 1,6 ≤ 2,0 | > 2,0 ≤ 2,5 | > 2,5 ≤ 3,0 | > 3,0 ≤ 4,0 | > 4,0 ≤ 5,0 |
| > 600<br>≤ 1 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ± 0,06                                                                               | ± 0,07      | ± 0,09      | ± 0,10      | ± 0,11      | ± 0,13      | ± 0,18      | ± 0,19      | ± 0,21      | ± 0,23      | ± 0,25      |
| > 1 200<br>≤ 1 500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ± 0,07                                                                               | ± 0,08      | ± 0,10      | ± 0,11      | ± 0,12      | ± 0,14      | ± 0,20      | ± 0,22      | ± 0,23      | ± 0,25      | ± 0,27      |
| > 1 500<br>≤ 1 800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | —                                                                                    | ± 0,10      | ± 0,11      | ± 0,12      | ± 0,14      | ± 0,16      | ± 0,22      | ± 0,24      | ± 0,25      | ± 0,27      | ± 0,29      |
| <sup>a</sup> The thickness tolerances for sheet in coil form are the same as for sheet supplied in cut lengths but in cases where welds are present, the tolerances shall be double those given over a length of 15 m in the vicinity of the weld.<br><sup>b</sup> For specified strength levels of $R_e = 360 \text{ N/mm}^2$ and greater, increase the thickness tolerances by 10 % applying normal rounding-off procedures.<br><sup>c</sup> Tolerances for grade 550 shall be as agreed upon between the purchaser and the manufacturer.<br><sup>d</sup> Given the difference in tolerances and physical properties of hot rolled and cold rolled sheet products, the user and the supplier may negotiate a specific type of substrate. The relationship between coating mass in $\text{g/m}^2$ and the thickness in micrometres can be retrieved from the respective standards.<br><sup>e</sup> Thickness is measured at any point on the sheet not less than 25 mm from a side edge. |                                                                                      |             |             |             |             |             |             |             |             |             |             |
| NOTE Thicknesses up to 1,6 m are generally produced with cold-rolled substrate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                      |             |             |             |             |             |             |             |             |             |             |

Table 3 — Restricted thickness tolerances for commercial, lock-forming, drawing, drawing aluminum-killed, extra deep drawing (stabilized interstitial free) and structural quality coils and cut lengths — hot rolled substrate

Dimensions and tolerances in millimetres

| Specified width                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Thickness tolerances <sup>a, b, c</sup><br>for specified thicknesses <sup>d, e</sup> |             |             |             |             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------|-------------|-------------|-------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ≤ 2,0                                                                                | > 2,0 ≤ 2,5 | > 2,5 ≤ 3,0 | > 3,0 ≤ 4,0 | > 4,0 ≤ 5,0 |
| > 600 ≤ 1 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ± 0,14                                                                               | ± 0,15      | ± 0,16      | ± 0,18      | ± 0,20      |
| > 1 200 ≤ 1 500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ± 0,15                                                                               | ± 0,16      | ± 0,18      | ± 0,19      | ± 0,22      |
| > 1 500 ≤ 1 800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ± 0,15                                                                               | ± 0,18      | ± 0,20      | ± 0,22      | ± 0,23      |
| <sup>a</sup> The thickness tolerances for sheet in coil form are the same as for sheet supplied in cut lengths but in cases where welds are present, the tolerances shall be double those given over a length of 15 m in the vicinity of the weld.<br><sup>b</sup> For specified strength levels of $R_e = 360 \text{ N/mm}^2$ and greater, increase the thickness tolerances by 10 % applying normal rounding-off procedures.<br><sup>c</sup> Tolerances for grade 550 shall be as agreed upon between the purchaser and the manufacturer.<br><sup>d</sup> Thickness is measured at any point on the sheet not less than 25 mm from a side edge.<br><sup>e</sup> The relationship between coating mass in $\text{g/m}^2$ and the thickness in micrometres can be retrieved from the respective standards. |                                                                                      |             |             |             |             |

**Table 4 — Restricted thickness tolerances for commercial, lock-forming, drawing, drawing aluminum-killed, extra deep drawing (stabilized interstitial free) and structural quality coils and cut lengths — cold rolled substrate**

Dimensions and tolerances in millimetres

| Specified width    | Thickness tolerances <sup>a, b, c</sup><br>for specified thicknesses <sup>d, e</sup> |             |             |             |             |             |             |             |             |             |
|--------------------|--------------------------------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                    | ≤ 0,4                                                                                | > 0,4 ≤ 0,6 | > 0,6 ≤ 0,8 | > 0,8 ≤ 1,0 | > 1,0 ≤ 1,2 | > 1,2 ≤ 1,6 | > 1,6 ≤ 2,0 | > 2,0 ≤ 2,5 | > 2,5 ≤ 3,0 | > 3,0 ≤ 4,0 |
| > 600<br>≤ 1 200   | ± 0,035                                                                              | ± 0,045     | ± 0,05      | ± 0,055     | ± 0,065     | ± 0,08      | ± 0,09      | ± 0,11      | ± 0,12      | ± 0,13      |
| > 1 200<br>≤ 1 500 | ± 0,045                                                                              | ± 0,055     | ± 0,06      | ± 0,07      | ± 0,08      | ± 0,09      | ± 0,10      | ± 0,12      | ± 0,13      | ± 0,14      |
| > 1 500<br>≤ 1 800 | —                                                                                    | ± 0,06      | ± 0,07      | ± 0,07      | ± 0,08      | ± 0,09      | ± 0,10      | ± 0,12      | ± 0,13      | ± 0,14      |

<sup>a</sup> The thickness tolerances for sheet in coil form are the same as for sheet supplied in cut lengths but in cases where welds are present, the tolerances shall be double those given over a length of 15 m in the vicinity of the weld.  
<sup>b</sup> For specified strength levels of  $R_e = 360 \text{ N/mm}^2$  and greater, increase the thickness tolerances by 10 % applying normal rounding-off procedures.  
<sup>c</sup> Tolerances for grade 550 shall be as agreed upon between the purchaser and manufacturer.  
<sup>d</sup> Thickness is measured at any point on the sheet not less than 25 mm from a side edge.  
<sup>e</sup> The relationship between coating mass in  $\text{g/m}^2$  and the thickness in micrometres can be retrieved from the respective standards.

**Table 5 — Width tolerances for coils and cut lengths, not resquared**

Values in millimetres

| Specified width | Tolerance |
|-----------------|-----------|
| ≤ 1 500         | +7<br>0   |
| > 1 500 ≤ 1 800 | +10<br>0  |

NOTE For resquared material more restrictive tolerances are subject to negotiation.

**Table 6 — Length tolerances for cut lengths, not resquared**

Dimensions and tolerances in millimetres

| Specified width | Tolerance        |
|-----------------|------------------|
| ≤ 3 000         | +20<br>0         |
| > 3 000 ≤ 6 000 | +30<br>0         |
| > 6 000         | + 0,5 % × length |

NOTE For resquared material more restrictive tolerances are subject to negotiation.

Table 7 — Camber tolerances for coils and cut lengths, not resquared

| Form                                                                                                                                                                                                                                                 | Camber tolerance                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Coil                                                                                                                                                                                                                                                 | 20 mm in any 5 000 mm length       |
| Cut length                                                                                                                                                                                                                                           | $0,4 \% \times \text{length}$<br>0 |
| NOTE For resquared material more restrictive tolerances are subject to negotiation. Camber is the greatest deviation of a side edge from a straight line, the measurement being taken on the concave side with a straight edge as shown in Figure 1. |                                    |

Table 8 — Out-of-square tolerance for cut lengths, not resquared

| Dimensions                                                                                                                                                                                                                                                                                                                                                         | Out-of-square tolerance    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| All thicknesses and all sizes                                                                                                                                                                                                                                                                                                                                      | $1 \% \times \text{width}$ |
| NOTE For resquared material more restrictive tolerances are subject to negotiation. Out-of-square is the greatest deviation of an edge from a straight line at right angles to a side and touching one corner, the measurement being taken as shown in Figure 2. It can also be measured as one-half the difference between the diagonals of the cut length sheet. |                            |

Table 9 — Out-of square tolerances for resquared material

Dimensions and tolerances in millimetres

| Specified length                                                                                                                                                                                                                                                                                                                                                                                         | Specified width | Out-of-square tolerance                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------|
| $\leq 3\ 000$                                                                                                                                                                                                                                                                                                                                                                                            | $\leq 1\ 200$   | $\begin{smallmatrix} +2 \\ 0 \end{smallmatrix}$ |
|                                                                                                                                                                                                                                                                                                                                                                                                          | $> 1\ 200$      | $\begin{smallmatrix} +3 \\ 0 \end{smallmatrix}$ |
| $> 3\ 000$                                                                                                                                                                                                                                                                                                                                                                                               | All widths      | $\begin{smallmatrix} +3 \\ 0 \end{smallmatrix}$ |
| NOTE When measuring material to resquared tolerances, consideration should be given to extreme variations in temperature. Out-of-square is the greatest deviation of an edge from a straight line at right angles to a side and touching one corner, the measurement being taken as shown in Figure 2. It can also be measured as one-half the difference between the diagonals of the cut length sheet. |                 |                                                 |

**Table 10 — Standard flatness tolerances for commercial, lock-forming, drawing, drawing aluminum-killed, and extra deep drawing stabilized interstitial free) quality in cut lengths <sup>a</sup>**

Dimensions and tolerances in millimetres

| Specified thickness | Specified width        | Flatness tolerance <sup>b, c</sup> |
|---------------------|------------------------|------------------------------------|
| $\leq 0,7$          | $\leq 1\ 200$          | 15                                 |
|                     | $> 1\ 200 \leq 1\ 500$ | 18                                 |
|                     | $> 1\ 500$             | 22                                 |
| $> 0,7 \leq 1,2$    | $\leq 1\ 200$          | 12                                 |
|                     | $> 1\ 200 \leq 1\ 500$ | 15                                 |
|                     | $> 1\ 500$             | 19                                 |
| $> 1,2$             | $\leq 1\ 200$          | 10                                 |
|                     | $> 1\ 200 \leq 1\ 500$ | 12                                 |
|                     | $> 1\ 500$             | 17                                 |

<sup>a</sup> This table also applies to sheet cut to length from coils by the customer when agreed-upon flattening procedures are performed. For specified strength levels of  $R_e = 360\text{ N/mm}^2$  and greater, increase the flatness tolerances by 25 %.

<sup>b</sup> Maximum deviation from a flat horizontal surface: with the sheet lying under its own weight on a flat surface, the maximum distance between the lower surface of the sheet and the flat horizontal surface is the maximum deviation from flatness as shown in Figure 3.

<sup>c</sup> These tolerances are only applicable to sheet up to and including 5 000 mm length when the thickness is 5 mm or less. Tolerances for sheet exceeding 5 000 mm in length shall be subject to agreement.

**Table 11 — Restricted flatness tolerances for cut lengths excluding structural quality**

Dimensions and tolerances in millimetres

| Specified thickness | Specified width | Specified length | Flatness tolerance <sup>a b</sup> |
|---------------------|-----------------|------------------|-----------------------------------|
| $\leq 2$            | $\leq 1\ 200$   | $\leq 2\ 500$    | 9                                 |
|                     | $> 1\ 200$      | $> 2\ 500$       | 15                                |
| $> 2 \leq 5$        | $\leq 1\ 200$   | $\leq 2\ 500$    | 8                                 |
|                     | $> 1\ 200$      | $> 2\ 500$       | 13                                |

<sup>a</sup> Tolerances for sheet exceeding 5 000 mm in length shall be subject to agreement.

<sup>b</sup> Maximum deviation from a flat horizontal surface: with the sheet lying under its own weight on a flat surface, the maximum distance between the lower surface of the sheet and the flat horizontal surface is the maximum deviation from flatness as shown in Figure 3.