

# Hot-dip galvanized narrow strip

Product information



thyssenkrupp

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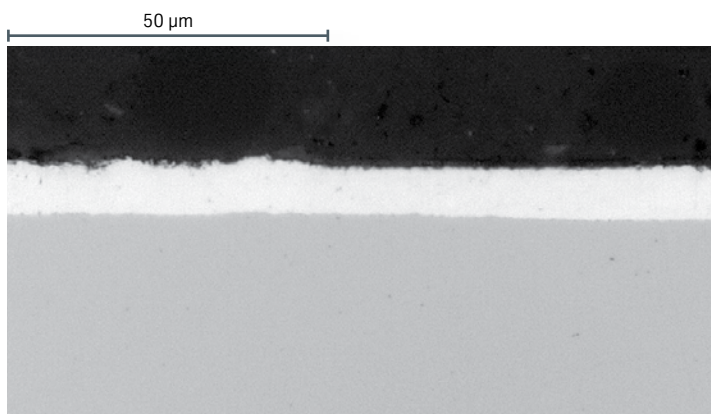
## Areas of application

Hot-dip galvanized narrow strip from thyssenkrupp combines the advantages of batch galvanizing with those of Sendzimir galvanizing. The application of an all-round zinc coating in weights of 120 to 500 g/m<sup>2</sup> per side provides optimum corrosion protection.

Depending on the choice of base material, and with a thinner zinc coating, hot-dip galvanized narrow strip displays good adhesion and forming properties.

The material is found in a variety of applications, e.g. as roller shutter doors, garage door accessories, structural angles, building hardware, starting material for gutter brackets, shelving, pallets, automotive components, lightning conductors, earthing strips, and hoops for the barrel industry.

### Example of the microstructure of hot-dip galvanized narrow strip



Zinc coating  
Iron-aluminum intermediate coating  
Steel

Microscopic structure of Z in vertical section.

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## Available steel grades

### Steel grades and coating

Coating

#### To DIN EN 10111, 10025-2

##### Steel grade

● DD11	GI
● DD12	GI
● S185	GI
● S235	GI
● S275	GI
● S355	GI

Other steel grades to DIN EN 10111 and 10025-2 on request.

- Hot-rolled strip
- GI Hot-dip galvanized

## Technical features of the production

The hot-rolled narrow strip is slit to the end width required by the customer on an upstream splitter. Burr-free cut edges can be produced by dressing on the same line if required.

Up to 12 strips of different sizes then pass simultaneously through the galvanizing process, which comprises strip preparation, pickling with subsequent rinsing, activation with downstream drying, galvanizing including cooling, and post-treatment if required, and the exit section.

Pickling and activation prepare the surface of the strip to allow the zinc to adhere to the steel surface. Any oxide coating is removed using hydrochloric acid. The flux contained in the flux bath, which must be dried in the drying furnace, ensures that the zinc is applied to the strip reliably and evenly.

On request, hot-dip galvanized narrow strip can be supplied in a variety of hot-rolled steel grades to DIN EN 10111 and DIN EN 10025-2.



Coils ready for despatch.

The zinc coating is applied in a bath of molten zinc at a temperature of approx. 470°C. Primary corrosion protection in the form of chemical passivation using covex® T can be carried out after cooling. More information is provided in the section on coating. If no chemical treatment is required, the hot-dip galvanized narrow strip is coiled in a dry, i.e. non-oiled condition.



Narrow strip galvanizing line.

## Surface

### Ordering group and zinc coating

	Zinc coating surface in [g/m <sup>2</sup> ]	
	Mean value	Single spot test

### To DIN EN 10111, 10025-2

#### Ordering group

Ordering group	Mean value	Single spot test
GI120	120	95
GI150	150	120
GI225	225	180
GI300	300	240
GI400	400	320
GI500	500	400

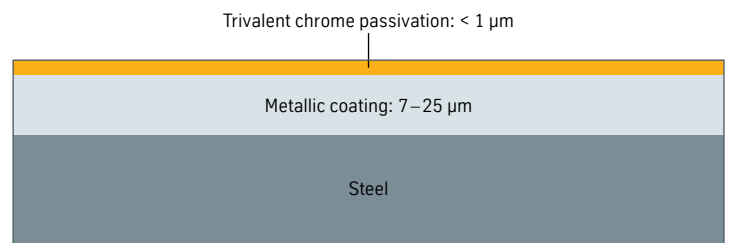
Hot-dip galvanized narrow strip is available in a variety of coating weights, including 120, 150, 225, 300, 400 and 500 g/m<sup>2</sup> each side, depending on grade, strip cross-section and finish. Other coating weights can be supplied by arrangement.

## Surface treatment

The hot-dip galvanized, hot-rolled strip can be supplied with chemical passivation or dry, i.e. with no subsequent treatment of the zinc coating. In chemical passivation with covex® T, the surface of the zinc coating is treated in such a way as to change the metal surface and create a passive top coat.

Chemically passivated surfaces provide protection primarily against the effects of humidity and reduce the risk of corrosion products being formed during transit and storage. The metallic appearance is maintained. When stored and transported under the proper conditions, a 3-month guarantee is provided against the formation of corrosion products or white rust. The formability of the material is unaffected, and there is no change to the coefficient of friction. Degreasing of the metallic coating is still possible, although it is recommended that certain conditions are met.

### Coating structure



More details on degreasability and further processing properties are contained in the product data sheet covex® T.

## Dimensional tolerances

### Thickness

The nominal thickness is the thickness of the finished hot-dip galvanized narrow strip. Different tolerances can be agreed separately when ordering.

#### Permissible thickness tolerance

Nominal thickness [mm]	Zinc coating in [g/m <sup>2</sup> ]	
	150/225	300/400/500
≥ 15 < 100	± 0.18	-0.18 + 0.24
≥ 100 ≤ 200	± 0.20	-0.20 + 0.26

#### Hot-dip galvanized narrow strip to CM094 (German Steel Federation)

Nominal thickness [mm]	± 0.15	-0.15 + 0.21	± 0.18	-0.18 + 0.24
≥ 1.0 < 2.0	± 0.15	-0.15 + 0.21	± 0.18	-0.18 + 0.24
≥ 2.0 < 4.0	± 0.17	-0.17 + 0.23	± 0.20	-0.20 + 0.26
≥ 4.0 < 5.0	± 0.19	-0.19 + 0.25	± 0.22	-0.22 + 0.28

### Width

The nominal width is the width of the finished hot-dip galvanized narrow strip. Undersizes on the nominal width are not permissible. The permissible oversize can be reduced by agreement when ordering.

#### Permissible oversizes on nominal width

Permissible oversize [mm]

#### Hot-dip galvanized narrow strip to CM094 (German Steel Federation)

Nominal width [mm]	Permissible oversize [mm]
≥ 15 < 40	+ 1.8
≥ 40 < 80	+ 2.2
≥ 80 < 130	+ 2.6

## Notes on applications and processing

### Corrosion protection

Applying a zinc coating to hot-rolled strip provides good general protection and ideal corrosion protection. The advantage of hot-dip galvanized narrow strip is that the edges are also coated.

The protective effect is based on the relative positions of zinc and iron in the electrochemical series. As zinc is less noble than iron, it is attacked first by environmental influences such as humidity, sacrificing itself and preventing the oxidation process on the steel surface.

However, overall corrosion behavior depends on various factors, such as temperature, electrical conductivity of the electrolyte, and the thickness of the top coat. Corrosion behavior can only be assessed taking the interaction of all these factors into account separately for each different application.

In general, the thicker the zinc coating, the greater the corrosion protection.

### Forming

Hot-dip galvanized narrow strip displays good forming properties. When selecting the coating thickness it should be noted that formability improves with decreasing coating thickness. The choice of material is based on the forming requirements and the final shape of the workpiece. Forming dies need to be adapted because the zinc coating displays different physical properties. Draw-in radii and die clearances must be larger than for uncoated material.

The use of sinter metals or specially treated die surfaces can reduce the risk of cold welding. Drawing lubricants are generally required when forming hot-dip galvanized narrow strip, and machine parameters such as blankholder force must be matched to the different flow properties of the coated material.

### Joining

All thermal and mechanical joining methods can be used, as can adhesive bonding. However, the particular properties of the Z coating require the processing parameters to be adapted compared with uncoated materials. Joining techniques which do not impair the surface of the strip and thus preserve the anticorrosion properties of the coating include threaded connections, riveting and hemming. The problem of contact corrosion between different materials must be addressed on a case-to-case basis.

### Welding

When using fusion welding processes, the zinc coating burns off locally in the weld zone, exposing the surface areas below, which then have no corrosion protection. Suitable post-treatment of the weld is required to counter environmental influences. Laser welding has proven to be a very good fusion welding process due to its low heat input into the weld zone. Resistance welding methods can also be readily used because the original protection remains largely intact. However, compared with uncoated material, electrode force, electrode current and electrode cooling need to be adjusted to take the factors steel grade, strip thickness and zinc coating thickness into account.

### Brazing

Hot-dip galvanized narrow strip is readily brazable. The great advantage of brazing is that the corrosion protection is retained in full because the vaporization temperature of zinc is higher than the melting points of soft and hard solder. The zinc coating must be treated with a suitable flux in preparation for brazing. Here too, the increased thickness of the coating must be taken into account.

### Coating

An organic coating can be applied to the hot-dip galvanized narrow strip for enhanced corrosion protection and/or for decorative reasons. The zinc coating provides good adhesion properties, which can be further improved by a chemically passivated surface. Thorough cleaning with a special cleaning agent and activation of the surface are necessary to avoid adhesion problems.

## Available dimensions

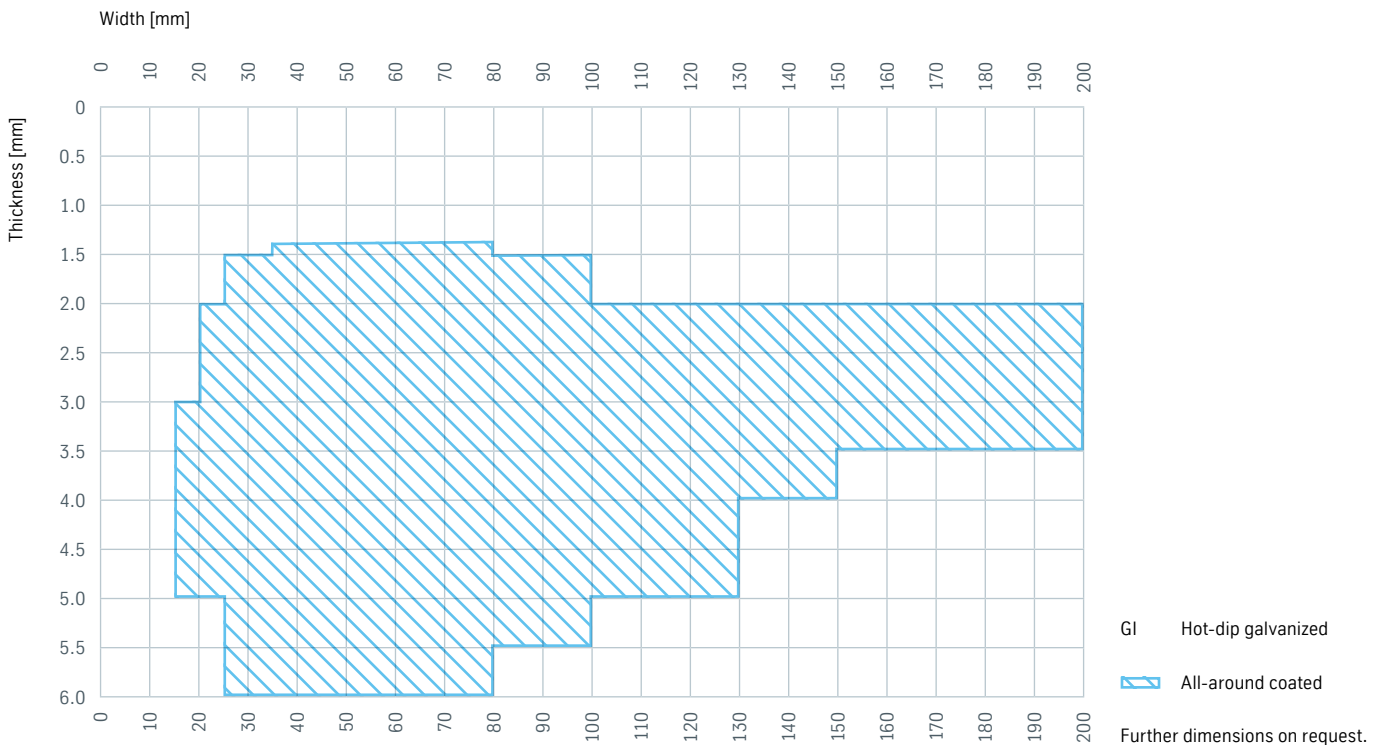
### Available shapes and sizes<sup>1)</sup>

Coils	
Inside diameter	508 mm
Outside diameter	max. 1,600 mm
Coil weights	25–1,500 kg
Coil lengths	min. 20 m
Multi-coil weights	500–4,500 kg

Cut lengths	
Length	500–7,500 mm
Width	max. 120 mm

Spools	
Spool outside diameter	max. 1,500 mm
Spool inside diameter	508 mm
Spool weight	max. 4,500 kg
Spool width	200–800 mm
Strip width	max. 60 mm
Strip thickness	2.0–5.0 mm

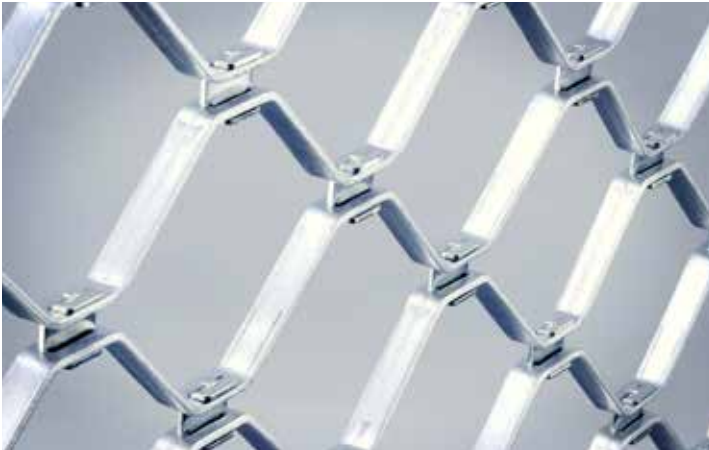
<sup>1)</sup> Coils are available in vertical and horizontal axis position.



## Sample applications



Pipe clamps.



Rolling grille gates.

Special mill grades are supplied subject to the special conditions of thyssenkrupp. Other delivery conditions not specified here will be based on the applicable specifications. The specifications used will be those valid on the date of issue of this product information brochure.

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