

Steel

# covex<sup>®</sup> S & covex<sup>®</sup> E

Product information for additional coating



thyssenkrupp

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## Brief profile

covex<sup>®</sup> is a thin, transparent, colorless additional coating for metallic coated surfaces. It provides and/or enhances the following properties in thyssenkrupp sheets:

- Corrosion protection during storage and transport
- Fingerprint resistance (anti-fingerprint property)
- Forming characteristics (also when dry)
- Immediate paintability without further pre-treatment

The applied sealants are dry to the touch and are available in covex<sup>®</sup> S (Cr(III)-based coating) and covex<sup>®</sup> E (Cr-free coating) variants.

## Production

covex<sup>®</sup> can be applied to almost all metallic coated thyssenkrupp products according to customers' requirements. The transparent, organic film is applied in a continuous production process by a no-rinse method (ChemCoater).

The products used by thyssenkrupp are fully compliant with the following EU directives banning the use of compounds containing Cr(VI):

- Electrical industry: Directive 2011/65/EU
- Automotive industry: Directive 2000/53/EC, with a restriction for Cr(VI) as from July 1, 2007
- REACH Regulation (EG) No. 1907/2006 – amendments of the REACH regulation are continually taken into account

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# Content

01	Brief profile
01	Production
02	Product properties
04	Information on application and processing
05	Dimensions

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## Product properties

### Product properties of sheet surfaces with covex® additional coatings

		GI		ZM	ZA	AS
		covex® E	covex® S	covex® S	covex® E	covex® E
<b>Sealing (S)</b>						
Corrosion protection	temporary	●	●	●	●	●
	permanent	○	○	○	○	○
Anti-fingerprint		●	●	●	●	●
Resistance to cleaning agents		●	●	●	●	●
Solvent resistance		●	○	○	●	●
Formability		●	●	●	●	●
Paintability		○	●	●	●	●
Weldability		○	●	●	●	●
Environmental sustainability		●	●	●	●	●

- Good or very good
- Adjustment may be required
- None

GI Hot-dip zinc coating  
 ZA galfan®  
 ZM ZM Ecoprotect®  
 AS Aluminum-silicon coating

### Composition

- Transparent, colorless coating with organic polymers
- Contains oxidically bound contents of titanium, zirconium, silicon or chromium (in the form of Cr<sup>3+</sup>)
- The layer weight is generally 1 g/m<sup>2</sup> (corresponds to a coating thickness of approx. 1 µm)

The specified values are reference values which can be adjusted to obtain special properties according to customer requirements.

### Corrosion protection

covex® S and covex® E coatings provide significantly enhanced protection of metallic coatings against surface corrosion. In contrast to the protective coatings of covex® T final treatment systems (temporary corrosion protection coating = passivation), the sealants continue to have a corrosion-inhibiting effect even after the final products have been produced.

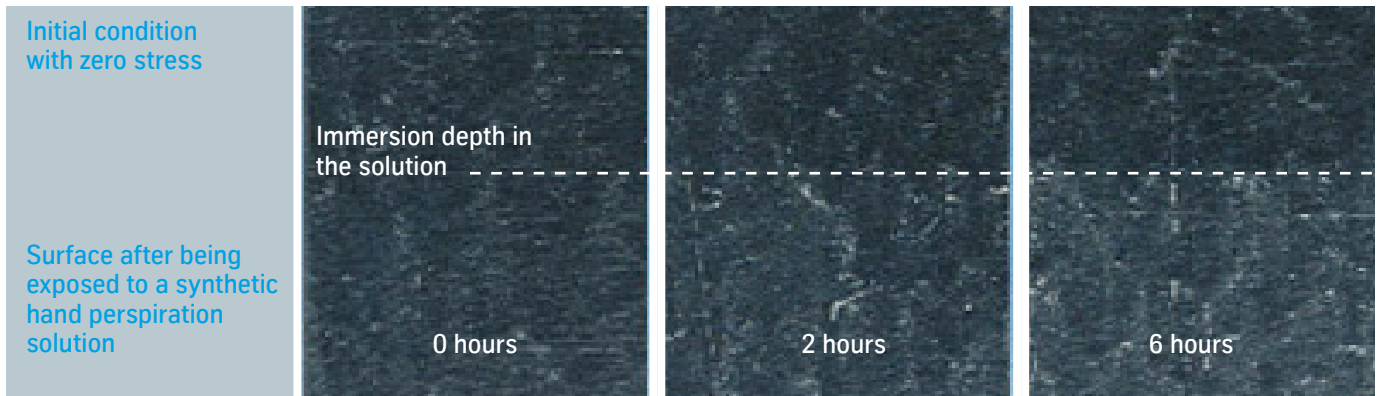
The barrier effect of the sealants ensures that the gloss of the sheet is retained longer and delays the darkening of the metallic coating, thus also enhancing the corrosion protection if the goods are exposed to outdoor weather. Regardless of the positive improvements of properties produced by covex®, the information provided in the leaflet of Stahl-Informationen-Zentrum entitled "Storage and transport of metallic coated strip and sheet" (MB114) must be observed. Further information about the availability and characteristic features of sealed surfaces is provided in the brochure entitled "Hot-dip coated strip and sheet" (CM95). All documents are available free of charge at the following link: <http://www.stahl-online.de/index.php/service/publikationen/>.

The maximum warranty period for non-corrosiveness of a coated surface of this type is four months.

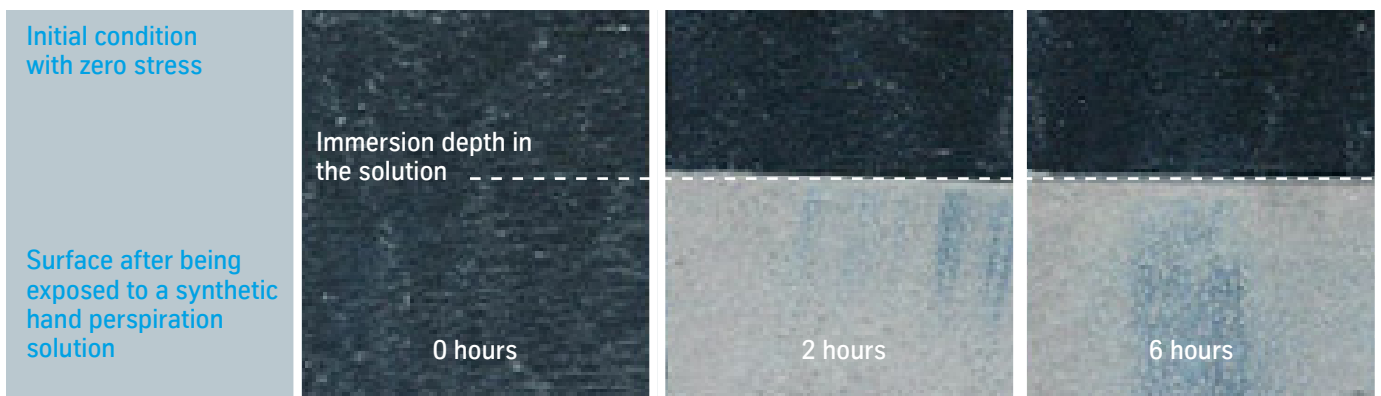
## Anti-fingerprint properties

Coating with covex® prevents any stains being produced by perspiration from the hands.

### Test of anti-fingerprint properties: hand perspiration test on sealed ZA-coated sheet



### Test of anti-fingerprint properties: hand perspiration test on unprotected ZA-coated sheet



## Information on application and processing

### Forming

Coating surfaces with covex® has a positive effect on the forming process:

- Significant improvement of tribological properties
- Better slide properties
- Improved dry lubrication
- Easier to form, draw and bend
- Metal wear is prevented as far as possible

### Degreasing

The surfaces can be degreased if the following points are observed:

- Degreasing solution: pH 4–10, temperature < 60°C, short dip times
- Combination agents for simultaneous degreasing and phosphating cannot be used; conduct preliminary test, if necessary

### Painting

- Surfaces coated with covex® can be painted without any further pre-treatment
- The sealant acts as a primer for powder coating
- The product does not contain any components which may adversely affect painting, such as silicon

A test paint is recommended where special requirements are concerned.

### Joining

#### Mechanical joining

Hot dip-coated sheets with a covex® coating can be mechanically joined. In principle, this can be done without further pretreatment of the sheets as delivered. If the sheets have to meet extreme requirements we recommend to conduct a preliminary test (if sample material is provided, thyssenkrupp will carry out a preliminary check of the joining parameters). If lubricants have to be removed in individual cases, this should be done using a mild degreasing agent (see degreasing).

### Soldering

covex® coated products cannot be brazed or soldered. The sealant must be removed in the joining areas for this application.

### Inert gas, pulse, laser and oxyacetylene welding, arc soldering

These processes can be used without any problems. The welding vapors must be extracted as specified in the regulations for hot-dip coated sheets. The covex® coating may be damaged in the immediate vicinity of the heat-affected zones.

### Projection/resistance spot welding

The sheets with a covex® S additional coating are well suited for this application. covex® E coatings are only suited for this application to a limited extent, since the electrode life only allows for a few spots to be welded before the electrode surface has to be cleaned. In combination with a welding current control, which allows to run a preheating process via a current up-slope or a separate preheating pulse, it is recommended to use covex® S surfaces whenever possible. If this is not possible, measures for electrode reworking (e.g. milling) may have to be provided or an agreement on the welding process used and its parameterization may have to be reached.

### Continuous temperature stress

covex® coating systems are designed to resist long-term exposure to a temperature of 150°C, and short-term exposure to temperatures of up to 300°C, for example for stove-enameled coatings.

### Protection guidelines for the end products and their disposal

- Hot-dip galvanized sheet with covex® coating systems must be handled in the same way as hot-dip coated sheet without additional coating
- The waste disposal guidelines are the same as those for hot-dip galvanized sheet
- The halogen-free organic resins do not require any other precautions

Dimensions				
	Width [mm]		Thickness [mm]	
	Strip (Coil)	Sheet	Strip (Coil)	Sheet
<b>Surface coating</b>				
Z (Hot-dip zinc coating)	600 – 1,550	600 – 1,500	0.30 – 3.25	0.30 – 3.25
ZM Ecoprotect®	600 – 1,550	600 – 1,500	0.30 – 3.20	0.30 – 3.20
ZA galfan®	700 – 1,600	700 – 1,600	0.40 – 2.50	0.40 – 2.50
AS (Aluminum-Silicon coating)	600 – 1,550	600 – 1,550	0.30 – 3.20	0.30 – 3.20

### Nomenclature for purchase orders

Reference to “sealing” is sufficient as order specification for the covex® additional coating. The abbreviation “S” is used for this purpose, e.g. DX51D+Z275 - N A - S .

DX51D	Steel grade
Z	Hot-dip galvanized surface
275	Target layer weight for the metallic coating in g/m <sup>2</sup>
N	Normal spangle pattern
A	Normal surface
S	Surface protection - sealed

### Final note

All information is based on our in-house laboratory tests. On account of the variety of actual basic conditions, deviations may occur in practice. We recommend to conduct tests on a case-by-case basis. Please contact us if you need further information or advice.

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.

#### General note

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