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This document provides information on the ordering and processing options for pladur® organic coil-coated sheet manufactured by thyssenkrupp Steel Europe AG (hereinafter thyssenkrupp Steel).

## 1. Base materials/dimensions and form

### 1.1 Cold-rolled sheet

DIN EN 10130

Cold rolled low carbon steel flat products for cold forming

DIN 1623

Cold rolled strip and sheet – General structural steels

### 1.2 Electrolytically zinc-coated sheet

DIN EN 10152

Electrolytically zinc coated cold rolled steel flat products for cold forming

DIN 1623

Cold rolled strip and sheet – General structural steels

### 1.3 Hot-dip-galvanized sheet

DIN EN 10346

Continuously hot-dip coated steel flat products, mild unalloyed steel

DIN EN 10346

Continuously hot-dip coated steel flat products, general structural steels

Different types of coating are available as required:

- Zinc coating (Z)
- galfan® zinc-aluminum coating (ZA)
- ZM Ecoprotect® zinc-magnesium coating (ZM)
- Aluminum-silicon coating (AS)

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## 1.4 Tolerances on dimensions and shape

### DIN EN 10131

Cold rolled uncoated and zinc or zinc-nickel electrolytically coated low carbon and high yield strength steel flat products for cold forming – Tolerances on dimensions and shape

### DIN EN 10143

Continuously hot-dip coated steel sheet and strip – Tolerances on dimensions and shape

## 2. Organic coatings

### 2.1 Organic coatings

#### DIN EN 10169

Continuously organic coated (coil coated) steel flat products

### 2.2 Quality properties

The quality properties relate to the upper side of the material.

With standard coated pladur®, only the upper side has a defined coating; the reverse side has a simple single-layer coating with no special properties in terms of appearance, formability, bonding, foam adhesion, and corrosion protection.

Special quality properties on the reverse side shall require a separate written agreement.

### 2.3 Color differences

Minor deviations in color and gloss are possible. These process-related characteristics cannot be considered to be flaws. If necessary, a reference standard can be agreed upon.

### 2.4 Effect coatings, textured coatings and installation instructions

At present, effect coatings (e.g., metallic coatings) and textured coatings (e.g., wrinkle textures) from different production batches may be subject to color deviations or deviations in visual appearance brought about by the way the structure of the coatings forms. As a result, it cannot be guaranteed that products with coatings from different batches can be installed next or close to one another.

To ensure that a facade or wall has a uniform appearance throughout, we recommend to use materials from one order item for a closed surface, taking production from the same paint batch into account.

In addition, care should be taken to ensure that all formats, components, trapezoidal sections and/or sandwich elements are installed in the same direction as the original direction of the coated strip. Direction markings (arrows) can be applied, as agreed, to the reverse side of the strip by means of stamps to ensure that the correct direction can be easily identified.

All the arrow markings on the elements installed in a single surface area must point in the same direction in order to ensure that the color remains optically uniform.

The possibility cannot be ruled out that previous or subsequent shipments of coil-coated materials can be combined with materials also installed. Before they are installed together, however, a color comparison must be carried out in direct daylight. Here, too, the direction of the strip must also be adhered to.

## 3. Protective film

### 3.1 Application

With a few exceptions, all pladur® products can be supplied in the form of coils or blanks with a temporary, removable protective film. The protective film minimizes/reduces the risk of the organic surface coating being soiled and/or suffering mechanical damage during transport or while being processed by the customer. In general, the film is applied to one side of the products immediately after coil coating and must then be removed after a defined maximum application period (see point 3.5).

### 3.2 Types of film

Two different types of film are available depending on the requirements:

Hot-laminated protective film (HLF)

Material: Polyethylene (PE)

Thickness: 100–150 µm

Adhesion: Adhesion without glue, applied thermally

Cold-laminated protective film (CLF)

Material: Polyethylene (PE)

Thickness: 60–120 µm

Adhesion: Adhesion using polyacrylate-based (PAC) glue

### 3.3 Protective film applied by customer

If the customer uses self-adhesive protective film (CLF), the application conditions must be agreed in advance with thyssenkrupp Steel.

### 3.4 Material thicknesses > 2.00 mm

We recommend the use of protective films for organic-coated materials with a thickness of 2.00 mm or more to prevent flaws arising on their surface during transit or processing. If no protective film is used, the risk of resultant material damage shall be borne exclusively by the customer.

### 3.5 Maximum application period

The film must be removed a maximum of six months after delivery, or after a maximum of four weeks exposure to weather conditions, after production or after the products have been installed.

High thermal stresses must be avoided. Removal of the protective film is adversely affected by the influence of frost and/or direct sunlight (UV radiation). Temperatures of 5°C and below can lead to the protective film becoming brittle. Depending on the temperature and/or weather, the surface may need to be briefly heated before the protective film is removed in order to ensure the film behaves uniformly across its entire surface area during removal and to avoid premature tearing of the film. We recommend conducting trial attempts to remove the film beforehand.

Never allow protective films to come into contact with solvents, substances that contain solvents, or polyurethane foams since this could permanently impair the adhesion of the film.

Failure to follow these instructions means that we cannot guarantee that it will be possible to remove the protective film perfectly.

To prevent the creation of undesirable lateral marks when the protective film is removed, the film must be removed exerting as constant a force as possible and at a constant speed.

### 3.6 Recycling

All types of protective film are made either of pure hydrocarbon polymers (polyethylene [PE]) or of polymers comprising carbon, hydrogen and oxygen (e.g., polyvinyl acetate [PVA]) and can therefore be recycled.

Excessive contamination with substances of a different type before the recycling process should be avoided as far as possible.

If protective films are contaminated with substances that contain oil and/or grease, they must be disposed of in accordance with current special-waste regulations.

## 4. Order quantities

For process and production reasons, the order quantity per item should be at least one coil unit (between approx. 18 kg/mm and approx. 20 kg/mm of strip width depending on dimension and steel grade) or a multiple thereof.

Surplus and shortages (S&S) for order quantities per item and individual call order are permitted as follows:

Order quantity	Short delivery	Surplus delivery
< 10t	30%	30%
10 to 30t	20%	20%
> 30t	10%	10%

Note: We reserve the right to supply minimum production units for “fixed dimensions” and bespoke designs.

## 5. Delivery in coils

### 5.1 Coil weights

If a maximum coil weight is agreed, the weight of 75 % of the coils supplied must be between 75 % and 100 % of the maximum coil weight (per item). Up to 25 % of the supplied coils may be between 25 % and 75 % of the maximum coil weight (per item). Smaller coils of less than 25 % of the maximum coil weight cannot be ruled out totally as a result of the nature of the process and can also be supplied.

### 5.2 Permitted limits for flaws (as a percentage)

It is not technically possible to guarantee that coils will be 100 % free of flaws. Due to the continuous production process and associated inability to separate out and reject sections containing flaws, there is a possibility of 2 % flaws per order position. Within individual coils, the flaw rate may be higher (>2%) for either product- or production-related reasons. Appropriate limits for the number of flaws permitted must be agreed on an individual basis. This provision applies to the upper side of the coil; minor coating flaws on the reverse side – even when the coil is coated on both sides – are of no significance when determining the flaw rate (percentage).

### 5.3 Further processing

The customer must have suitable decoiling, cutting, straightening, and stacking equipment available in order to process the material from coil shipments.

## 6. Delivery of blanks

### 6.1 Delivery

Blanks are supplied sorted. Top blanks are used as protective blanks and count as part of the packaging and may therefore show signs of damage.

### 6.2 Permitted limits for flaws (as a percentage)

Despite sorting, it is technically impossible to guarantee 100 % freedom from flaws in the case of blanks. A flaw rate of 1 % of the order quantity per item may occur.

In the case of special orders, permitted limits for flaws are to be agreed with thyssenkrupp Steel.

## 7. Weighing

Gross weight is net weight.

## 8. Packaging

Suitable types of packaging must be agreed upon for shipments of coils and blanks to protect the products from damage, moisture, and/or soiling and to secure the material while it is in transit and storage. The relevant guidelines must also be observed (see point 15).

pladur® must be transported and stored only in a manner that suits the material and it must be permanently protected from the effects of moisture.

Moisture ingress and condensation formation caused by a failure to handle the material correctly during transport and storage or owing to force majeure and the resultant consequences are not the responsibility of the manufacturer.

## 9. Instructions for use and processing

The following instructions for use and processing are intended as a guideline. We expressly recommend that you obtain detailed advice for the respective application. This ensures that important aspects such as the protection of cut edges, the selection of suitable material combinations to prevent contact corrosion and design measures for corrosion protection are taken into account.

The tools should be designed to suit the material, with a smooth, clean surface being a matter of course. Polished and hard chrome-plated tools are recommended. They reduce friction, thus avoiding damage to the surface. Where great importance is placed on flatness, we recommend using a suitable straightening machine, as in the case of uncoated flat material.

The ambient temperature when processing must be at least 18 °C, otherwise the processing properties will not be given or will be negatively influenced.

Glossy marks caused by transport or storage are not a quality defect. They can be removed by heating the surface.

## 10. Aging and shelf life

All organic-coated products in the pladur® range are steel-based materials. The steel itself, the metallic coating and the organic coating are all subject to a natural ageing process. Since the forming properties of pladur® products can change over time, the products should not be stored for a period in excess of six months from the date on which notification is given that the products are ready for shipment before they are used by the customer. If the products are stored for a period longer than this, thyssenkrupp Steel cannot provide any guarantee that the material will still be suitable for use.

## 11. Cleaning and repair work

### 11.1 Cleaning

#### General

Organic coil-coated steel sheets can become dirty as a result of use. In the case of moving parts, e. g., roller shutters or doors, dirt can not only reduce mobility, but also lead to abrasion and wear of the coating system, which in turn can impair the look and protective effect of the coating. Furthermore, dirt or algae and moss can hinder drying of the surfaces and thus lead to corrosion.

Organic coil-coated steel sheets should be inspected once a year and cleaned, if necessary. Care must be taken to ensure that the cleaning measures do not damage the organic coil-coated surface. To ensure this, the surface should be cleaned carefully using cold or lukewarm water (maximum 50 °C) or mildly alkaline cleaning agents (pH 6–9) without oxidizing agents, e. g., with active oxygen (peroxide, perborates) or active chlorine (chlorates, hypochlorites). Abrasive agents or dirty cleaning aids must never be used because of the risk of scratches. After cleaning, the surface must be thoroughly rinsed with cold water.

Soft brushes can also be used to remove particularly stubborn dirt. The suitability of the brush should be checked first in a small, inconspicuous area to avoid scratches. If you use high-pressure cleaning equipment, the pressure of the devices must be limited to 30 bar and the lance must be held no closer to the steel sheets than 100 cm. The use of dirt blasters and high-pressure steam cleaners is not permitted.

Especially stubborn stains can be cleaned using a solution consisting of 10% neutral cleaning agent, 45% isopropanol and 45% water and then rinsed off with plenty of water.

Instructions for special kinds of soiling:

- Oils, greases, and waxes can be wiped off with a clean cloth soaked in benzene. Then rinse thoroughly with clear, warm water. The industrial safety regulations must be observed. Large areas soiled with oils, waxes, or greases must be cleaned by a specialist company.
- Plaster, concrete, and expanding foam must be wiped off immediately with a clean cloth as these materials can attack the surfaces.

- Graffiti can generally not be removed completely. However, there are special coatings from which graffiti can be removed. Please, contact thyssenkrupp Steel if you have further questions in this regard.

Recommendations are based on cleaning recommendations of the Stahl-Informations-Zentrum and of the ECCA Germany.

## 11.2 Repair work (dealing with damage)

### General

If scratches, rub marks, or other forms of surface damage occur when handling organic coil-coated steel sheets, it may be necessary to repair these areas for visual reasons and/or to maintain surface protection.

In principle, replacement with non-defective material should take precedence over repair, wherever possible. If damage occurs as a result of processing and/or use, it may be appropriate from an economic point of view to carry out a repair.

If repair work is required for one of the above-mentioned reasons, you must ensure that the area to be repaired does not entail damage to the entire system. The repair work must not, for instance, result in any capillary gaps or disturb permanent air flushing of the exposed cut edges.

Repaired areas do not provide the same level of protection as the undamaged organic coil-coated surfaces of the steel sheet – especially if the metallic plating underneath the organic coating has been permanently damaged. The repaired areas must be monitored separately at regular intervals (e. g., once a year) for any corrosion or other effects.

### Repair of small, local damage

In the case of small and local damage, such as scratches and rub marks, make sure that the surfaces of the damages and adjacent areas are dry, clean, and free of grease. Afterwards they can be repaired with air-drying systems. Minor local damage should be repaired by rebrushing or spraying.

### Large-area damage

In the event of having to recoat large areas, such as facades, the condition of the substrate and the compatibility of the existing coating with the new coating to be applied must be checked (cf. DIN 53221). This also applies if the old coating material is known.

The substrate must be free of oil and grease, dry and free of dust, dirt or insufficiently adhering layers of coating. High-pressure cleaning with water and, if necessary, the addition of a liquid cleaning agent is suitable for this purpose (make sure you rinse off well). Any corroded areas must also be cleaned by mechanical means, e. g., with a brush or belt sander (removal of the corrosion), and be coated with a special corrosion-protection primer before subsequently being recoated (apply coating to a large area).



The recoating system to be used must be adapted to the quality and esthetic requirements, the application possibilities, and the substrate. One- or two-component systems based on various vehicles can then be brushed, rolled, or sprayed on. The details are to be agreed upon between the user and the overcoater. Further information can be found in leaflet 229 entitled "Beschichten von oberflächenveredeltem Stahlblech" (Coating of surface-coated steel sheet), published by the Stahl-Informations-Zentrum.

Recommendations are based on repair recommendations issued by the Stahl-Informations-Zentrum.

Suitable refinishing kits for all coating systems are available from thyssenkrupp Steel for repairing damaged pladur® surface areas. In order for us to provide you with a suitable coating, you must specify the order reference of the material to be repaired. Product data sheets and supplementary application guidelines can be provided by thyssenkrupp Steel if required.

Before carrying out any repair work, the areas to be repaired must be examined to ensure that they comply with the instructions for use set out in the product data sheet. We recommend that you verify the suitability of the coating material in a concealed area before using it to carry out the repair.

The same quality demands in terms of surface finish cannot be made on the repaired or recoated area as for the coating as supplied ex-works.

## 12. Application

The specification of customer applications and conditions of use shall be accepted for reference purposes only.

Such specifications are not based on any guarantee of the use-related suitability of the material.

No warranty from thyssenkrupp Steel can be derived from this. Warranties require separate, contractually agreed assurances. Compliance with the regulations and requirements to be observed in the respective country of use is the responsibility of the customer.

## 13. Cutting

### Cutting pladur®

Figure 1: Cutting burr to the steel side

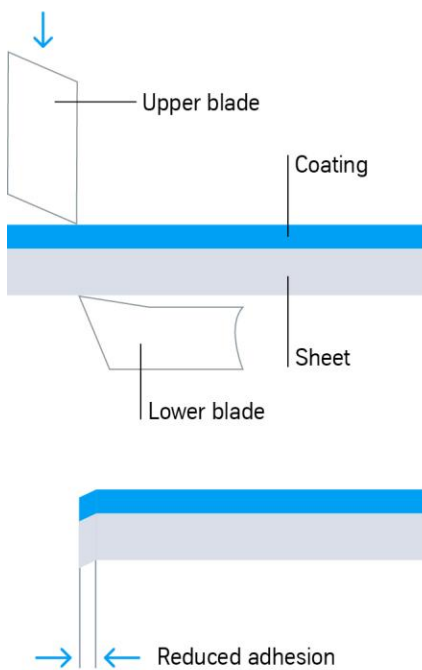
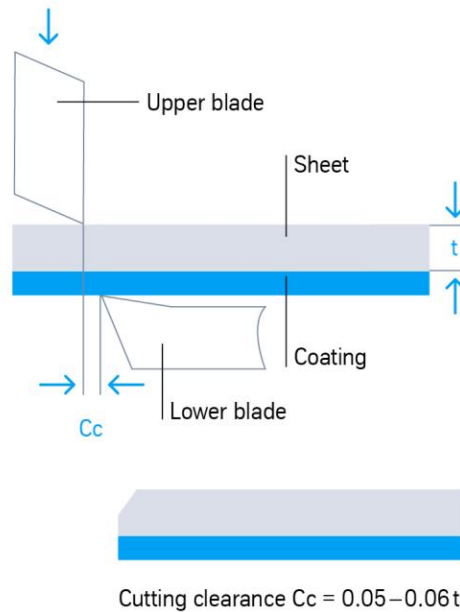


Figure 2: Cutting burr to the coating side



## 14. Processing of complaints

Complaints must be reported to thyssenkrupp Steel in writing without delay, i. e. within five working days.

Visible transport damage must be noted on the delivery note on taking receipt of the goods and must be documented by means of photos. Here, too, the damage must be reported to thyssenkrupp Steel without delay.

thyssenkrupp Steel must always be given the opportunity to repair the material or deliver a replacement, as thyssenkrupp Steel sees fit, without assuming any consequential costs.

Complaints must be documented by an informative flaw description, photos, and/or samples in order to be able to process them. The following minimum pieces of information are required for complaints to be processed:

- Customer name, consignee
- Coil or package number concerned, with corresponding order number and delivery note
- Quantity concerned in tonnes, linear or square meters
- Detailed description of the reason for the complaint
- Customer claim

Moreover, thyssenkrupp Steel shall have the right to inform themselves on site, without hindrance, about the nature and scope of the complaint and to document the claimed damage, e. g., to take photos and product samples. thyssenkrupp Steel is entitled to include upstream suppliers and commissioned third parties in the investigation. Additional analyses requested by the customer will be charged to the customer if no fault on the part of thyssenkrupp Steel can be derived from them.

## 15. Reference literature

The latest versions of the following documents are applicable:

Charakteristische Merkmale 093  
“Organisch bandbeschichtete Flacherzeugnisse aus Stahl”  
ISSN 0175-2006

Stahl-Informations-Zentrum  
Sohnstraße 65, 40237 Düsseldorf, Germany  
[www.stahl-info.de](http://www.stahl-info.de)

DIN EN 10169  
Continuously organic coated (coil coated) steel flat products

DIN  
Deutsches Institut für Normung e.V.  
Burggrafenstraße 6, 10787 Berlin, Germany  
[www.din.de](http://www.din.de)

VDI Guideline 2700  
Securing of loads on road vehicles

Verein Deutscher Ingenieure e.V.  
VDI-Platz 1, 40468 Düsseldorf, Germany  
[www.vdi.de](http://www.vdi.de)

Product data sheets

Available from: Contact/Sales

General Terms & Conditions of Sales and Delivery of thyssenkrupp Steel Europe AG

Available from: Contact/Sales

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 technical delivery conditions.

#### General information

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