

Steel

patinax®

Notes on application and processing



thyssenkrupp

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Areas of application

patinax® weathering steel from thyssenkrupp gets its weather-resistant properties from the alloying elements copper, chromium, nickel and phosphorus. Due to its chemical composition, weathering steel displays greater resistance to atmospheric corrosion than conventional structural steel because an oxide protective layer forms on its surface under changing weather influences which is virtually impermeable to oxygen. Particularly in outdoor use, these properties ensure patinax® provides advantages that conventional structural steel cannot offer. patinax® is mainly used unprotected, i.e. without additional paint or metallic coatings.

Due to its natural rust color, weathering steel blends in beautifully with the surroundings, which is why it is typically used for bridges, landscape structures, electricity pylons, facades and steel sculptures. Thanks to its high corrosion resistance, patinax® is also used for containers, mine cars and tanks.

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Forming

The conditions for hot forming comply with the requirements of EN 10025-5. For cold forming operations the information in Table 6 of EN 10025-5 applies. If mechanical properties are altered by cold forming, the strength properties specified in the table can be largely restored by stress relieving – for at least 30 minutes at 530 to 580 °C. Subsequent normalizing is recommended for higher degrees of forming. Cold formability may be reduced by phosphorus.

Machining

With regard to the processes, tooling and practices to be used the same conditions apply as for comparable carbon structural steel in accordance with EN 10025-2.

Flame cutting

patinax® is suitable for flame cutting, provided proper operating methods are used. At temperatures below 5 °C a sufficiently wide zone on either side of the intended cut should be preheated. If flame cut edges are to undergo cold forming, the hardening effect should be prevented by preheating or the hardened zones must be removed, e.g. by grinding.

Welding

patinax® is suitable for both manual and mechanized welding applying recognized standards of good practice (DIN EN 10025-5 and STAHL-EISEN-Werkstoffblatt 088). Recommendations for welding are also given in DIN EN 1011 part 1 and part 2. Special precautions should be taken when welding the high-phosphorus grade patinax® 355P. Suitable filler metals and appropriate welding conditions are essential to obtain the same mechanical properties in the weld as in the base material. Basic electrodes, gas-shielded welding wire and wire-powder combinations of strength class S355 are used as fillers. In unprotected use it must be ensured that the weld deposit is also weather-resistant. This can be achieved by using a weather-resistant filler metal matched in its alloying constituents to the base metal. If stress relieving is necessary for design reasons or due to building regulations, it should be carried out in the temperature range from roughly 530 to 580 °C.

Bolting and riveting

Fasteners such as bolts, rivets and accessories (nuts and washers) must be selected so as to avoid the formation of local electrochemical cells. Fasteners should preferably be made of weathering steel, but experience shows that the use of stainless steel has no adverse effect. In these joints, capillary action can lead to permanent moisture resulting in increased corrosion. Critical zones should therefore be protected by painting, sealing or other means.

General information

Information about the nature or usability of materials or products serves as a description. Assurances regarding the existence of certain properties or a specific purpose always require written agreements. Technical changes reserved. Reproduction, even in part, only with the permission of thyssenkrupp Steel Europe AG.