



STAINLESS STEEL IN CONSTRUCTION – IS THERE NO ALTERNATIVE?

Stainless steel is a favoured material in the construction sector. However, for those looking for assured corrosion protection and high functionality in the construction process whilst at the same time bearing in mind costs, alternatives are available.

Brackets and fasteners are subjected to extreme situations in the construction field: fluctuating temperatures in summer and winter, varying ambient air at the coast, in industrial environments and in the countryside. Stainless steel is often used here, characterised as it is by long lifetime and high robustness with low maintenance costs and an attractive appearance. DIN EN ISO 10088 defines the use of different types of stainless steel; for fasteners in particular the categories A2 and A4 are common, as described in DIN 3506.

Situation regarding
installation is decisive:
DIBt approval required

Blank metallic, silk-matt or polished to a high-gloss finish: the numerous creative aspects make stainless steel an indispensable material popular with

many architects. For load-bearing and therefore safety-relevant applications a general construction supervision approval needs to be granted. This is granted by the Deutsches Institut für Bautechnik (DIBt). In the current version a number of stainless steel types are defined with their property class and assigned to different corrosion resistance categories of between 1 and 5. This enables a choice to be made from suitable approved materials for different (corrosion) specifications. As in many other industries, the construction sector is subject to extreme price and cost pressure. Despite this, in many cases there is no alternative to using stainless steel, for example due to hygiene reasons or where extreme longevity is required for outdoor or exposed offshore use. However, whilst stainless steel is chosen as an “all-round package”, alternatives do exist. The decisive question here is: what

longevity should the component have and in what environment is it to be installed?

High-tensile steel coated with
zinc flake system as alternative

Dörken MKS-Systeme has recognised this and gone in search of alternatives that are attractively priced yet highly reliable. Following extensive and time-consuming testing at the DIBt, the combination of steel with a coating consisting of zinc flake base coat and specially customised top coat emerged. These combinations received the general construction regulation approval of DIBt in 2015 and satisfy the requirements of the corrosion resistance categories C3 to C5-M (as per DIN EN ISO 12944-2).



AN ALTERNATIVE WITH MANY CAPABILITIES

This approval applies to fastener elements and components made from steel with a zinc flake coating from Dörken MKS-Systeme. Typical environments for category C5-M are the inside of buildings or areas with almost constant condensation and in exterior use coastal and offshore use with high levels of salt.

If stainless steel has been selected as a long-lasting all-round package, the designer is sure to have made a good choice. However, at second glance, the use of stainless steel is not necessary in many cases. In each individual case the precise installation conditions should be checked and approval granted on an individual basis. We undertake this in individual projects with our customers by carrying out sampling and testing in our own tech centre.

Once zinc flake has proven its capabilities on (high-tensile) steel, it represents an economical yet effective alternative: coated steel elements are often three to five times cheaper than individual stainless steel varieties. As the stainless steel price is dependent on the price of

the alloying components and primarily the price of nickel as a commodities exchange metal, it is subject to strong fluctuations. Stainless steel fastener elements in particular also require a complex manufacturing process, which can also double the price again under certain circumstances.

The "on-tops" of zinc flake coating include the avoidance of contact corrosion, which always occurs where other metallic materials are installed with stainless steel. As stainless steel is nobler than galvanised steel, zinc or aluminium, under the influence of moisture it forms a galvanic element in which the less noble metal corrodes: it sacrifices itself. For example, screwing a stainless steel screw into structural steel can result in the connection failing – unless a rubber spacer separates the different materials from one another. If the zinc flake system is chosen as a solution, the organic top coat can be used as an insulation layer to keep the metals apart. Alternatively, both materials may consist of coated steel, ensuring that the flow of electrons is reduced or prevented.

Coated steel fastening bolts and screws in particular also offer the opportunity of setting the coefficient of friction via the top coat. In this case there is no risk of abrasion or galling.

These two variants also enable a specific colour to be achieved, as the colour of the top coat can be chosen, with additional colour variants beyond the standard colours of black or silver. In addition, high-tensile steels can also achieve savings of weight and space, which can be a criteria for restricted-space constructions in particular.

We will be happy to discuss the following subjects with you:

- Stainless steel alternatives: (no) time for reworking
- DIBt and corrosiveness category C5-M
- Economical in-house solution
- Hydrogen brittling

In Russia facade brackets are produced from steel and protected against corrosion with a DELTA-MKS® zinc flake system. Construction regulatory approval has been granted for this safety component for the Russian market.



hours without rust formation in salt spray testing pursuant to DIN EN ISO 9227 and thereby fulfil the prescribed stand times of DIN EN ISO 12944 category C5-M. This also served to persuade a manufacturer of wind energy plants.