

The perfect link

# **Corrosion Protection**

## For a lasting connection!





#### ...Damage caused by corrosion can be avoided! - with suitable anti-corrosion measures.

The screw connection itself as a "corrosion system" should, in use, be at least as corrosion-resistant as the parts to be connected.

It is the responsibility of the developer to determine the necessary anti-corrosion measures. The wear reserve of a corrosion protection system and the environmental conditions must be taken into account.

As a specialist in fasteners, VELA Schrauben is very well aware of the importance of corrosion-resistant clamping screws, clamping washers and accessories.

Corrosion resistance is usually the decisive argument when it comes to choosing the material. Nevertheless, basic knowledge of corrosion protection and the types of corrosion is important for the proper design of modern and contemporary mechanical connections.



In the case of metals, chemical corrosion is of particular importance. The most wellknown type of chemical corrosion in metals is rusting i.e. the oxidation of iron.

The concept of corrosion is described in DIN EN ISO 8044 (replaces DIN 50900) as follows:

"Corrosion is the reaction of a metallic material with its environment, which causes a measurable change in the material and can lead to an impairment of the function of a mechanical component or an entire system. In most cases this reaction is electrochemical in nature, but in some cases it can also be chemical or metal-physical in nature."

Types of corrosion are differentiated according to material, cause and appearance. The standard defines 36 different types of corrosion, the following 3 types are the most relevant for connection technology.



## • Surface corrosion:

The even removal of the attacked surfaces due to the surrounding medium. > general rust

**2** Crevice corrosion:

In material gaps or between assembled components due to aggressive media (e.g. sea water) and lack of oxygen to restore passivation. > e.g. with gas hoods, digestion towers

• Contact corrosion:

Electrochemical process

through contact of different metals > e.g. under screw heads

Screw connections can be refined to counteract corrosion more permanently by surface and/or chemical screw coatings.

We offer fasteners with chromium(VI)-free coatings in a variety of designs for both, galvanic and zinc flake systems.

### Galvanic finishes

Galvanizing by Cr(VI)-free passivation.

Galvanizing is still the standard for most fasteners. In contrast to the past, Cr(VI)free passivations are no longer used for post-treatment.

= The so-called Cr(VI)-containing yellow chromatings can be replaced by thick-layer passivation, which can achieve a comparable level of corrosion resistance of the

coating, while the coating thickness of the zinc plating is the same.

Higher demands on corrosion resistance, such as in the automotive sector, can only be met with galvanic processes with zinc alloy coatings based on zinc-nickel or zinc-iron, passivation and, if necessary, an additional top coat.

These top coats also allow adaptation to different requirements such as colour design or defined friction parameters.







Zinc flake coatings, especially for spring steel parts, have very good corrosion resistance.



## Other technical information / explanation of terms

#### **Corrosion protection**

Galvanic corrosion protection system according to DIN ISO 4042

This standard primarily specifies the dimensional requirements for fasteners made of steel and copper alloys that are to be provided with a galvanic coating.

DIN EN ISO 4042 does not distinguish between chromium (VI)-containing and chromium (VI)-free surface coatings

#### Label example

A surface designation must always consist of the code letter + code number + code letter.

#### DINISO 4042 - A2F

Desingnation of the plating metal
Desingnation minimum coating thickness
Besingnation finish and chromate-treatment

Coating thickness in	2				
One coating metals	Two coating metals	Designation			
No layer thickness	-	0			
3	-	1			
5	2+3	2			
8	3+5	3			
12	4+8	4			
Not complete only partial excerpt from ISO 4042					

Coating metal/alloy		1	Finish	Passivation by	Designation
Symbol	Elements	Designation	Dull		•
Zn	Zinc	А	Duli		A
Cu	Copper	С	Semi-bright	No colour	E
CuNi	Coppor pickol	G		Bluish to bluish iridescent	F
Culvi	Copper-nickei	G		Yellowish gleaming to yello-brown, iridescent	G
ZnNi	Zinc-nickel	No standard			
Not complete only partial excerpt from ISO 4042			Drab olive to olive-browb	н	
			Bright	Bluish to bluish iridescent	к
		Not complete only partial excerpt from ISO 4042			

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