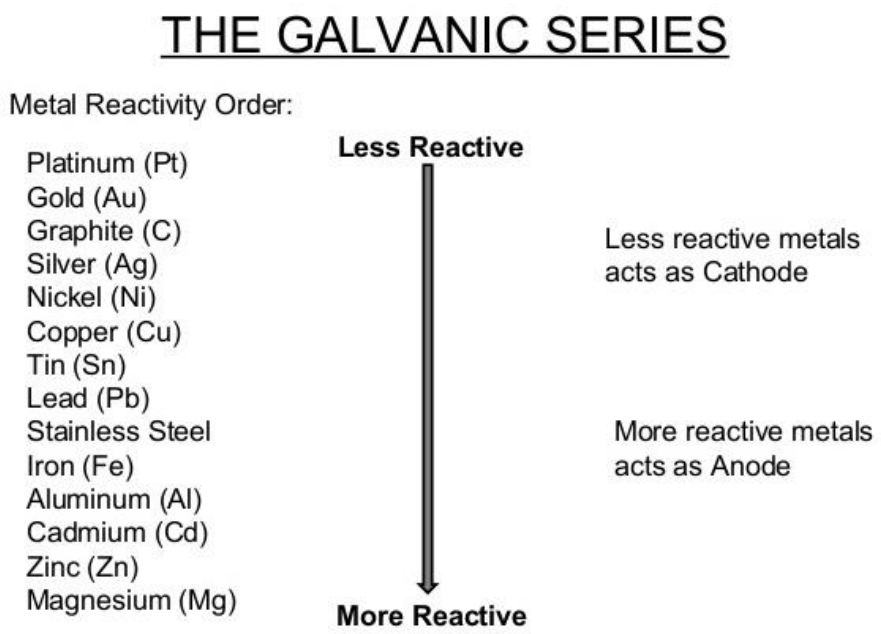
Good2know that… a short elaboration of filiform and galvanic corrosion.

In addition to discussing the different types of corrosion in the Good2Know-article of last week, we would like to make an extra note on galvanic corrosion & galvanic series, and filiform corrosion.

Galvanic corrosion is an electrochemical process in which one metal corrodes preferentially to another when both metals are in electrical contact, in the presence of an electrolyte.

All metals can be classified into a galvanic series representing the electrical potential they develop in a given electrolyte against a standard reference electrode. The relative position of two metals on such a series gives a good indication of which metal is more likely to corrode more quickly.



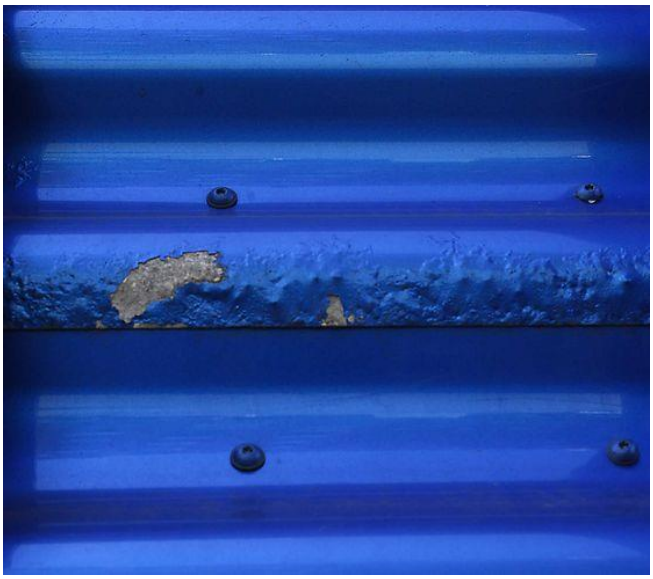
The compatibility of two different metals may be predicted by consideration of their anodic index. This parameter is a measure of the electrochemical voltage that will be developed. To find the relative voltage of a pair of metals it is only required to subtract their anodic indices.

Often, when design requires that dissimilar metals come in contact, the galvanic compatibility is managed by finishes and plating.

Filiform corrosion

Filiform corrosion is local corrosion that may arise on aluminum, zinc, magnesium and steel substrates. The deterioration is reflected as fine (almost invisible) threads under the coating layer (organic layer). In a further stage, these threads will cluster, forming a kind of blistering that results in coating suppression.

Filiform corrosion is not so much damaging the strength of the metal, but negatively affects its appearance.



Research goes to show that the possible causes of filiform corrosion are numerous: substrate problem, construction, design, assembly, pretreatment, application method, pressure in effect, presence of salts, climate, air pollution, the maintenance (schedule) and the applied coating system, although there is a strong presumption that it is mostly the composition of the substrate that provokes this type of corrosion.

To reduce the possibility of filiform corrosion taking effect, a number of precautions need to be considered. Below is a brief list of measures to be taken into account, on which we will elaborate in the next Good2Know.

- The building executing companies have to possess a quality guarantee process system
- Substrate material needs to be ordered on the basis of detailed specifications
- The separate parts of a building component (such as aluminum window profiles, …) all need to have the same material compilation specifications (f.ex. AA6060)
- Proper storage of products needs to be taken into account
- Proper pretreatment and curing process specifications need to be followed
- Design specifications
- Take appropriate measures and avoid contamination during construction

Read more on how to prevent corrosion damage in the coming Good2know-articles of February 2016!

Can we be of service? We are at your disposal on:

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* Source: Fontana & Greene, 1967