MAGON ACEROS

ORGANIC COATING CHOICE GUIDE

METALLIC COATING

Any metal exposed is subject to the corrosion process, which happens naturally and spontaneously. The speed at which the oxidation process takes place will depend on the temperature, where the metal is, and the nature of the metal itself. The corrosion process occurs when a current of electrons is generated by a difference in energy between two different points on the metal surface. When this happens, oxidation of the surface occurs on the part that has lost electrons.

Since oxidation implies a loss of mass of the metal, a prolonged oxidation would affect the mechanical properties of the steel.

Steels therefore have very limited resistance to corrosion. Metallic coatings were created to protect steel from the oxidation process described above. Metallic coating is possible provided that a metal with a higher charge is placed on another with a lower charge. The procedure consists of completely covering the steel with the chosen metallic coating, which can be either a continuous or a discontinuous process.

Once finished, it is the metallic coating that is exposed to the elements, and, therefore, to the oxidation process. These metallic coatings are designed to be highly resistant to oxidation and to last over time.

TYPES

There are a wide variety of metallic coatings available on the market. However, they all have one element in common: zinc, as it oxidizes more easily, protects the steel panel from oxidation when exposed to the environment.

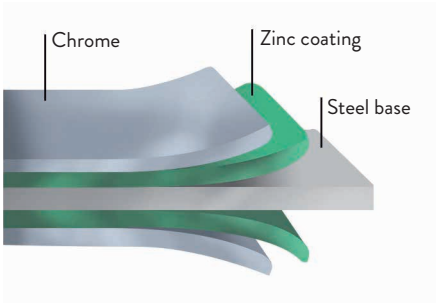
Among the different metallic coatings, the most used are:

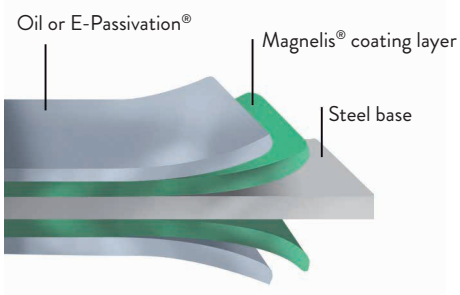
- Zinc or galvanized coating.

  This is a coating with a zinc percentage higher than 99%. It is the most widespread coating on structural profiles (Z and C profiles), commercial profiles for metal cladding (trapezoidal sheet, corrugated sheet, slat) and profiles for slabs.

- Zinc-magnesium coating.

  This is a coating made mostly of zinc, to which aluminum and magnesium are added, in a proportion of 1.5 to 8% of the total coating, with a minimum of 0.2% magnesium. Aluminum and magnesium improve the corrosion resistance of the coating.





In order to choose the right pre-lacquered material for each use, the person responsible for the design of the installation must take into account both the incidence of UV rays and the exposure to corrosive environments of the building or project.

- **Corrosion resistance of the paint system**

  To determine the corrosion resistance of a paint system, it is subjected to the salt spray test. This test evaluates the appearance of corrosion after a number of hours in a saline mist chamber. The results provide each paint scheme with an RC corrosion resistance value, from RC1 to RC5, with RC1 being the lowest value. This means that those RC3 rated paint schemes have shown their suitability for environments rated C3 or lower.

- **Resistance to UV radiation of the paint system**

  To determine the UV resistance of a paint system, it is subjected to the QUV accelerated ageing test. This test evaluates the loss of gloss and colour over time due to UV rays. The results provide each paint scheme with a UV resistance value RUV, from RUV1 to RUV4, with RUV1 being the lowest value.

- **Classification of environments**

DESCRIPTION OF CORROSIVE CATEGORIES FOR EXTERNAL ENVIRONMENTS

C1 Very Low.

C2 Low: Areas with low level of contamination. Mainly rural or industrial areas without significant presence of sulphur dioxide.

C3 Moderate: Urban and industrial areas with low sulphur dioxide (SO2) pollution and coastal areas with low salinity (10 km to 20 km from the sea).

C4 High: Industrial areas with moderate contamination by sulphur dioxide (SO2) and coastal areas with moderate salinity (3 km to 10 km from the sea).

C5 I Very high: Industrial areas with very aggressive atmospheres and major pollution by sulphur dioxide (SO2)

C5 M Very high: Coastal and maritime areas with high salinity (1 km to 3 km from the sea).

Corrosive environment category	Type of environment			
	Rural	Urban	Industrial	Marine
C1 - very low				
C2 -Low				
C3 - medium			SO_2 low	(10-20 km)
C4 - high			SO_2 moderate	(3-10 km)
C5 I - very high			SO_2 high	
C5 M - very high:				(1-3 km)

DESCRIPTION OF THE CATEGORIES OF UV RESISTANCE FOR EXTERNAL ENVIRONMENTS

Area 1: Areas not exposed to UV radiation. Indoor use without any radiation.
Area 2: Areas with low exposure to UV radiation or without special colour maintenance requirements.
Area 3: Areas with moderate exposure to UV radiation.
Area 4: Areas with high exposure to UV radiation or with special colour maintenance requirements.

- **Choosing paint systems for different environments**

Once the category of the environment is known, the person responsible for the design must decide on the painting system::

1) You will need to determine the suitable paint system in terms of corrosion. The following table can be used as a guide.

				Polyester	PVDF	HDX
Corrosion resistance category				**RC3**	**RC4**	**RC5**
Type of exterior atmosphere	Rural		C2	✓	✓	✓
	Urban		C3	✓	✓	✓
	Industrial	Low contamination	C3	✓	✓	✓
		Medium contamination	C4	X	✓	✓
		High pollution	C5	X	X	✓
	Marine	10 - 20 km	C3	✓	✓	✓
		3 - 10 km	C4	X	✓	✓
		1 - 3 km	C5	X	X	✓

2) You will need to determine the suitable paint system in terms of UV radiation. The following table can be used as a guide.

		Polyester	PVDF	HDX
UV resistance category		**RUV2**	**RUV4**	**RUV4**
Type of exterior atmosphere	Area 1	✓	✓	✓
	Area 2	✓	✓	✓
	Area 3	X	✓	✓
	Area 4	X	✓	✓

3) A suitable paint system should be chosen in terms of both corrosion resistance and UV resistance. The following cases can be used as a guide.

Strength category corrosion	Strength category UV	Choice
C3	Area 2	Polyester
C4	Area 4	PVDF
C5	Area 3	HDX

The data shown in the tables are guidelines and do not constitute a guarantee of the material. You should contact MAGON ACEROS for those applications which require a guarantee on the profiles steel.

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