



Requirements for **Natural Weathering Test Site** **(Corrosion)**



for Chemical Pretreatment Systems



the

global

standard

for

architectural

aluminium

finishing

Requirements for Natural Weathering
Test Site (Corrosion)

for Chemical Pretreatment Systems

QUALICOAT's Specifications give requirements for material quality, the pretreatment and the coating process and define the performance of the organic coating.

The natural weathering of coated aluminium products is critical in corrosive environments like marine or industrial areas. This document provides essential data from QUALICOAT on testing chemical pretreatment systems.

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1. Introduction

Coated aluminium products can suffer atmospheric corrosion when their surfaces are wetted in architectural applications, especially in locations with increased corrosivity, e.g. marine or industrial environments.

QUALICOAT's Specifications give requirements for material quality, the pretreatment and the coating process and define the performance of the organic coating.

Part of the approval testing for chemical pretreatment systems (excluding chemical chromate conversion) is natural weathering on a test site for a period of five years with interim approval after two years.

2. Requirements for test sites

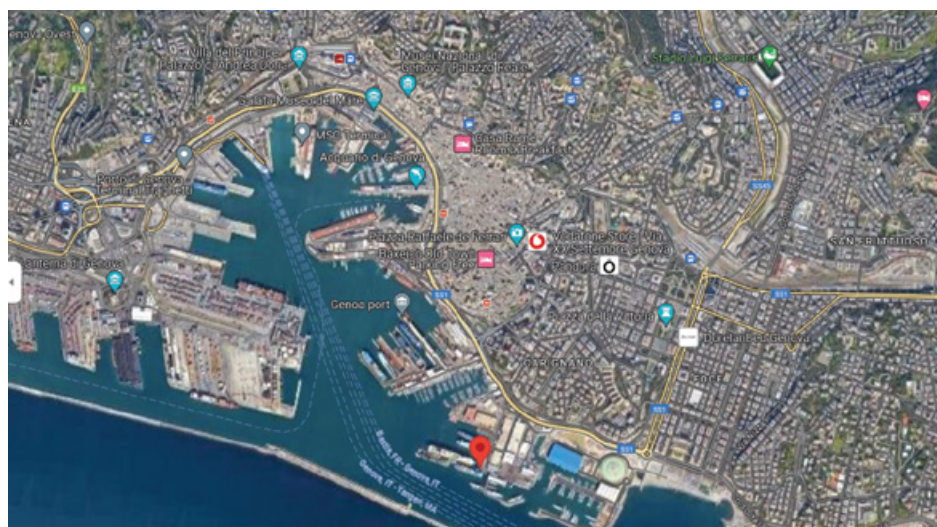
The European standard EN 12206-1 (Paints and varnishes – Coating of aluminium and aluminium alloys for architectural purposes – Part 1: Coatings prepared from thermosetting coating powder; Ed. July 2021) prescribes in Annex B that all alternate pretreatment systems for subsequent powder coatings shall have completed a minimum of two years for interim approval and five years for full approval natural exposure in a site with an environment with corrosion category C5 as defined by ISO 9223:2012, Table C.1:

ISO 9223:2012, Table C.1, Typical environments — Examples Corrosivity Category C5, Outdoor:

Temperate and subtropical zone, atmospheric environment with very high pollution (SO_2 : 90 $\mu\text{g}/\text{m}^3$ to 250 $\mu\text{g}/\text{m}^3$) and/or significant effect of chlorides, e.g. industrial areas, coastal areas, sheltered positions on coastline.

3. QUALICOAT exposure site

The test site used by QUALICOAT is located in Genoa (Italy). This location is in a coastal area at the sea level within few meters to the sea front. The site is pointed in the map by the red pin: it is located inside the Genoa harbour, close to the industrial area and surrounded by the city of Genoa. For sure it fulfils the description of a typical C5 environment given in ISO 9223:2012 Table C.1.:



Site name	Genoa Experimental Marine Station, GEMS
Country, region	Italy, Liguria region
Atmosphere	Marine-Urban
Altitude	0 m
Location	Coastal station placed inside the Genoa harbour, with several exposure racks at sea level and over the roof of a small building
Operational since	2005
Temp. [°C]	18 ± 1 (Period 2012-2019)
Rainfall [mm/year]	1254 ± 515 (Period 2012-2019)
Relative humidity [%]	64 ± 3 (Period 2012-2019)
pH of rain	5.7 (Period 2016-2020)
Time of wetness [%]	9 ± 4 (Period 2015-2019)
Chloride deposition [mg/m²*day]	57 (Period 2012-2019, wet candle method ISO 9225)

4. Additional information

While EN12206-1:2021 in Annex B explicitly requires a categorization according to Table C.1 in ISO 9223:2012, the categorization in the catalogue of official outdoor weathering sites is conducted according to the measured corrosion rate as described in paragraph 7 of ISO 9223:2012. This is the categorization method stipulated in ISO 8565:2011 'Metals and alloys - Atmospheric corrosion testing - General requirements'.

Due to the passivating behaviour of aluminium and the fact that the emissions of SO₂ in the EU have been reduced very drastically in the last decades, today not a single one of the official outdoor weathering sites in the EU reaches C5 for aluminium in the categorization according to the measured corrosion rate, even when an extremely high chloride deposition is present. The most evident example is Brest that has a chloride deposition of 1300 mg/(m² *day) and the corrosion rate is C5 for steel but only C3 for aluminium.



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