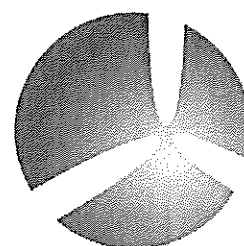


# EUROCORR 2013

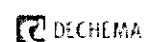
for a blue sky



## EUROPEAN CORROSION CONGRESS

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# BOOK OF ABSTRACTS

## Durability of absorber surfaces in solar thermal collectors

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The market for solar thermal applications is growing rapidly. The most important sales argument for solar absorber coatings, apart from the price, concerns their optical characteristics (solar absorptance and thermal emittance). However, these values may only apply to the initial status of the absorber. External environmental factors can degrade the absorber in a collector, causing the optical properties to deteriorate, so its degradation under service conditions must be predicted prior to use.

This work describes the study of two absorber surfaces (commercial selective film and selective organic coating) in different accelerated life testing with the purpose to qualify them in the terms of durability according to test methods established in the draft european standard prEN 12975-3-1 (high temperature degradation and degradation by the action of condensed water on the absorber surface). To quantify expected environmental stress of the absorber surfaces related to environmental factors, resistance to salt spray and to sulphur dioxide tests were also performed.

The coatings were characterized in terms of their optical properties (solar absorptance and thermal emittance), as well as the evaluation of the thickness, color, brightness and adhesion. The morphological and chemical characterization of coatings were also realized by scanning electron microscopy with energy dispersive spectroscopy associated (SEM/EDS).

According to the draft standard, the absorber surfaces were qualified in terms of its thermal stability and to its resistance to condensed water, ensuring a durability exceeding 25 years. It was found that after the study of the surfaces subjected to tests for resistance to salt spray and sulfur dioxide, the selective film suffered the greatest corrosion and therefore further degradation of optical properties. The optical performance of the selective organic coating was satisfactory regarding the requirements studied, presenting a greater anticorrosive protection against atmospheres with salt spray and sulphur dioxide. This study revealed that solar absorbing paints applied in highly reflective substrates appear as a valuable path for application in solar thermal collectors in environments with different kinds of contaminants.

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**Keywords:** solar absorptance, thermal emittance, optical performance, durability, solar absorber surfaces.