



**RESISTANCE TO WATER AND FUELS
ACCORDING TO ISO 2812-1
HUMIDUR FP COATING SYSTEM**

final report SGS INTRON B.V.

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1. INTRODUCTION

Acotec assigned SGS INTRON to test the coating system Humidur FP according to ISO 2812-1 with respect to resistance to water, gasoline diesel and biodiesel.

The Humidur FP coating system is a new Acotec development based on the Humidur ML(ME) system which has a very long (> 20 years) track record of good performance on mainly steel sheet piles in Belgium in sweet, brackish and salt water.

The main goal of the work carried out by SGS INTRON is to test the resistance of this new coating system against water, gasoline, diesel and biodiesel by an independent, qualified and recognized test institute. The test work conducted by SGS INTRON inclusive results and conclusion are described in this report.

2. SAMPLES AND TEST

Samples

All required test samples were provided by Acotec at the SGS INTRON laboratories as follows:

- samples with a Humidur FP coating system applied and fully cured on a steel substrate;
- free film samples of the Humidur FP coating system.

Testing

In each of the different fluids a number of 3 steel coated samples and 3 free film samples, as delivered, were exposed according to EN ISO 2812-1 method 1, within the following boundaries:

- Duration: 3 weeks;
- Total immersion of the samples;
- At 20 ± 2 °C;
- Test liquids used: water, gasoline, diesel and biodiesel.

After exposition the following tests were performed:

- Visual examination according to ISO 4628;
- Tensile strengths and Elastic modulus according to DIN 53504 (on free film samples);
- Discoloration according to the CIE-LAB method.

The tensile strength, Elastic modulus and discoloration were also conducted on non exposed samples.

3. RESULTS

3.1. Exposition testing

The free film samples of the Humidur coating system were exposed to water, gasoline, diesel and biodiesel. After being exposed for a period of three weeks, the samples were visually inspected and tested on color, shrinkage and flexural strength before and after exposition.

The exposition of the Humidur coating samples on steel substrates were evaluated upon visual integrity behavior such as debonding, blistering, cracking etc.. The results are presented in table1. In the appendix an overview of the exposed samples is presented.

Table 1. Results of exposing Humidur FP in water, gasoline, diesel and biodiesel.

Examination	Unit	Not exposed	3 weeks immersion test according to EN ISO 2812-1 (method 1)			
			Water	Gasoline	Diesel	Biodiesel
Visual ISO 4628	-	-	No loss of integrity, no debonding	No loss of integrity, no debonding	No loss of integrity, no debonding	No loss of integrity, no debonding
Tensile strength	N/mm ²	34	40	37	43	39
E-modulus	N/mm ²	2160	2200	1960	2480	2180
Discoloration [ΔE] Cie-lab method	-	0	0.45	2.12	0.32	0.52

The results of the test show that due to the (3 week) exposition to either water, gasoline, diesel or biodiesel the coating does not show:

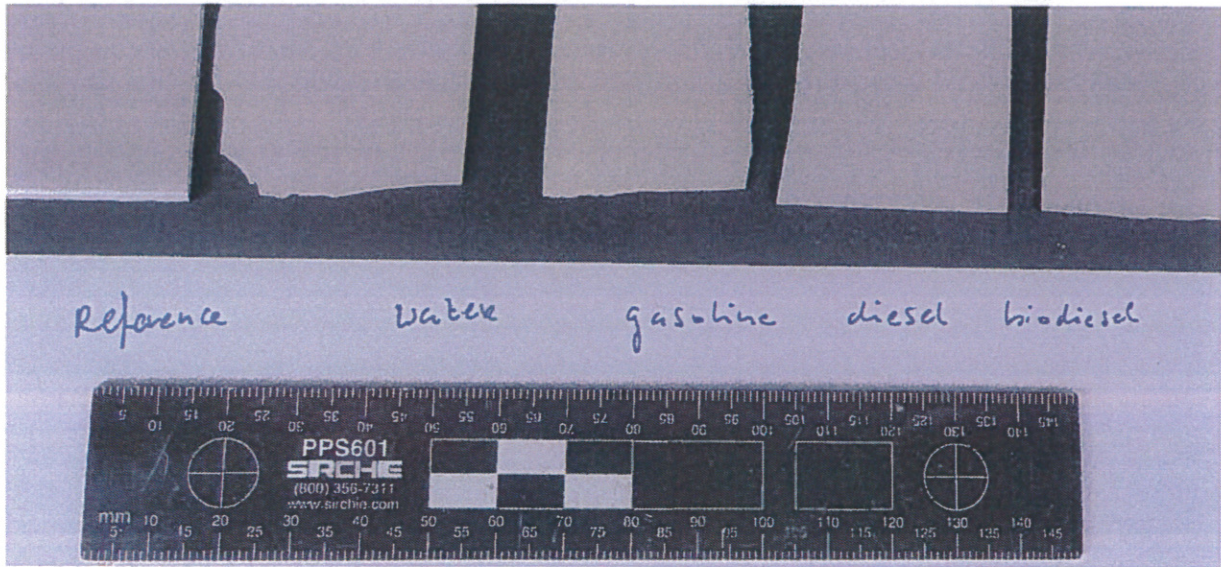
- any visual loss of integrity or debonding;
- decrease of the tensile strength;
- more than 15% difference in modulus of elasticity.

After exposition in all fluids the coating shows a visible discoloration. This effect is the most strongly after immersion into gasoline.

4. CONCLUSIONS

From the results of the exposition test according to ISO 2812, SGS INTRON concludes that the Acotec coating system Humidur FP is mechanically resistant to water, gasoline, diesel en biodiesel for a duration of 3 weeks. After exposition it can be concluded that in all fluids a discoloration appears. The discoloration is only visible with the exposition in gasoline ($\Delta E > 1$).

APPENDIX



Overview of tested samples after exposition

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