



REPORT

Testing of the resistance to fuel/water immersion
of Neoguard Phenol 333 applied to steel panels,
according to MIL-PRF-4556F Specification

Haarlem, January 21st, 2016

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1 INTRODUCTION

1.1 Commission

By order of Neokem SA in Attiki, Greece, the Centrum voor Onderzoek en Technisch advies (COT bv) in Haarlem, The Netherlands, has tested the resistance to fuel/water immersion on panels coated with Neoguard Phenol 333 according to MIL-PRF-4556F Specification, paragraph 4.3.17.

The test has been carried out in accordance with the COT quotation with the reference LAB15-0563-OFF. The order has been given by signing the fore mentioned quotation by Neokem.

1.2 Information

Table 1: Sample information

Cot sample number	Sample	Received
19-11-15/0737	3 fully coated steel panels, dimensions 75 x 150 x 1 mm	19-11-2015

The coating system on the steel panels has been applied by the client.
The coating system on thin (<1 mm) steel panels has been applied by COT bv.
Dry film thickness of the coatings has been determined by COT prior to testing.

2 PROCEDURE

Testing is based on MIL-PRF-4556F Performance specification: Coating kit, epoxy, for interior of steel fuel tanks (December 15, 1998).

The following activities have been performed:

Table 2: Activities according to MIL-PRF-4556F

Test	MIL-PRF-4556F	Method
Fuel and water resistance	4.3.17	As specified
Adhesion	4.3.18	ASTM D3359

3 REQUIREMENTS

3.1 Fuel and water resistance

The coating shall be applied on solvent cleaned and sand blasted steel panels to a dry film thickness of 0.003 to 0.004 inches (75 to 100 μ m). After 24 hours drying a second layer shall be applied. The total film thickness shall be 0.006 to 0.008 inches (150 to 200 μ m).

After 7 days curing immerse the panels in a mixture of Jet A-1 fuel (Kerosine) and distilled water (1 : 1 by volume) at 52 ± 1 °C. After an immersion period of 21 days the coating shall show no softening or loss of adhesion. A moderate darkening of the area immersed in the fuel is acceptable and there shall be no blistering to a greater extent than 3 small random blisters.

3.2 Adhesion

The panels which have been subjected to the fuel and water resistance test shall be used. After removal of the panels after 21 days immersion air dry the panels for 24 hours and determine the adhesion on both immersion areas. The adhesion shall have a rating of 3B or higher.

Note: due to the dry film thickness of the coating (approx. 400 micron), the prescribed adhesion test method (ASTM D3359-B) is not recommended.

4 RESULTS

4.1 Fuel and water resistance

After an immersion period of 21 days the coating shows no softening and no blistering.

Table 3: Immersion.

MIL-PRF-4556-F Par. 4.3.17	COT sample number 19-11-15/0737		
	Panel 1	Panel 2	Panel 3
Lowest DFT (µm)	428	305	367
Highest DFT (µm)	572	437	473
Average DFT (µm)	477 ± 57	351 ± 50	409 ± 42
Before immersion - reference			
Blistering	None	None	None
Hardness (Shore D)	88 ± 1	88 ± 1	89 ± 1
Adhesion ASTM D 3359-B	4B	4B	4B
Immersed - fuel phase			
Blistering	None	None	None
Hardness (Shore D)	88 ± 0	89 ± 1	88 ± 1
Adhesion ASTM D 3359-B	4B	4B	4B
Immersed - water phase			
Blistering	None	None	None
Hardness (Shore D)	87 ± 1	88 ± 1	88 ± 1
Adhesion ASTM D 3359-B	4B	4B	4B

CENTRUM VOOR ONDERZOEK
EN TECHNISCH ADVIES (COT)



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ANNEX

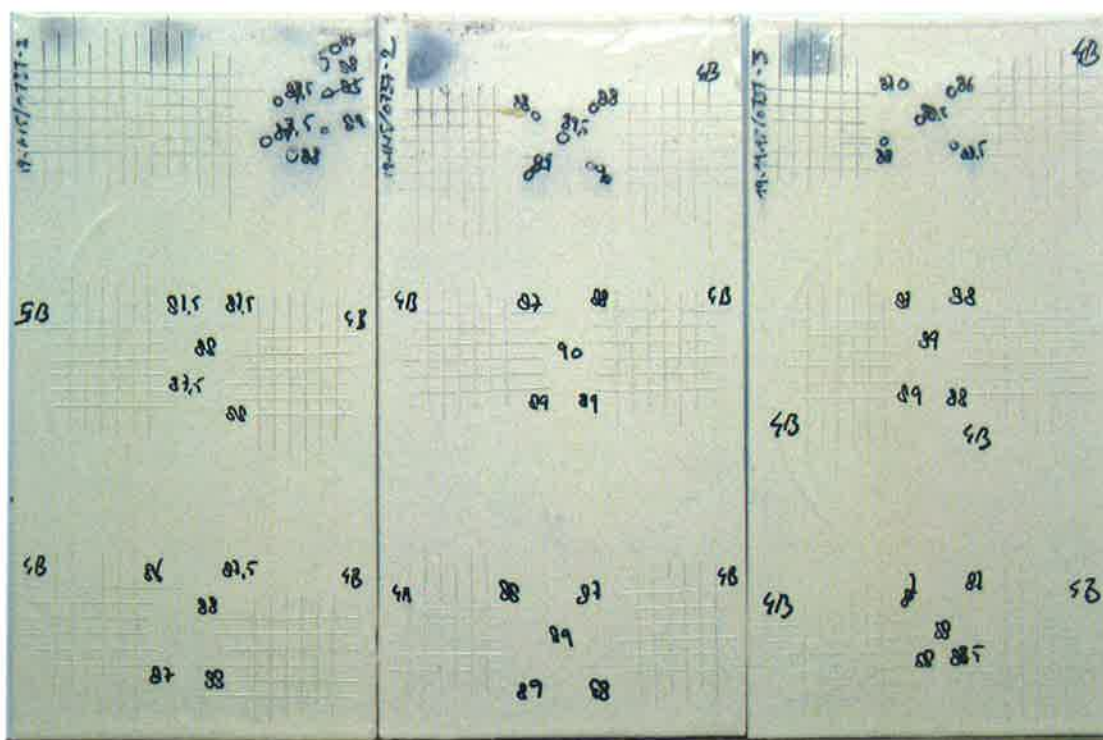


Photo 1: Test panels 19-11-15/0737-1, -2 and -3 after immersion in fuel/water.