

Competitive Analysis of EXCOR and Anticorit Films

Background: Two competitor films were submitted for evaluation and comparison of corrosion protection abilities. One sample is a clear yellow film, EXCOR, which is manufactured by Northern Instruments. The other film is Anticorit VCI film, manufactured by Fuchs DEA Schmierstoffe GmbH & Co. KG.

Purpose: Evaluate and compare the corrosion protection ability of EXCOR and Anticorit films.

Methods: FT-IR Spectroscopy
NO₂/NO₃ Test
Gas Chromatography
Razor Blade Test
TL-8135-002 (German VIA Test)
F-12 Cyclic Corrosion Test
SO₂ Test
FIAT Contact and Distance Test

Materials: Paragon 1000 FT-IR, Perkin Elmer
EM Quant NO₂ Test Strips (Charge/lot #80280225), EM Industries, Inc., Gibbstown, New Jersey
EM Quant NO₃ Test Strips (Charge/lot #80322977), EM Industries, Inc., Gibbstown, New Jersey
HP5890A Gas Chromatograph, Hewlett Packard, Charlotte, NC
HP5970B Mass Selective Detector, Hewlett Packard, Charlotte, NC
Razor Blade Test Kit
German VIA Test Kit
F-12 Test Kit
SO₂ Test Kit
FIAT Test Kit

Procedure: The tests listed above were performed according to the standard procedures for each, using 8 cycles for the F-12 test.

Results: *FT-IR Spectroscopy:* According to the spectra, the Anticorit film contains salts of carboxylates and some nitrite. The EXCOR film contains nitrite.



Gas Chromatography: The chromatograms reveal that the Anticorit film contains dicyclohexylamine, and the EXCOR film contains BHT (butylated hydroxytoluene), an anti-oxidant.

NO₂/NO₃ Test: The test strips indicated that the EXCOR film contains a high concentration of nitrite, and the Anticorit film contains some nitrite.

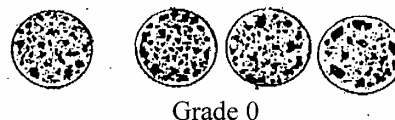
Material	F-12 Test			SO ₂ Test		
	Panel #1	Panel #2	Panel #3	Panel #1	Panel #2	Panel #3
EXCOR	Fail	Fail	Fail	Pass	Pass	Fail
Anticorit	Pass	Pass	Pass	Pass	Pass	Pass
VCI-126*	Pass	Pass	Pass	Pass	Pass	Pass
Control	Fail	-	-	Fail	-	-

*Typical results for VCI-126 film

Material	Razor Blade Test			German VIA Test		
	Panel #1	Panel #2	Panel #3	Plug #1	Plug #2	Plug #3
EXCOR	Pass	Pass	Pass	Grade 2		
Anticorit	Pass	Pass	Fail	Grade 0		
VCI-126*	Pass	Pass	Pass	Grade 3		
Control	Fail	-	-	Fail	-	-

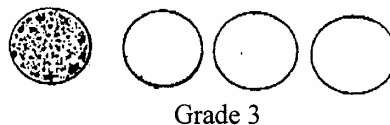
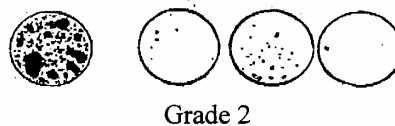
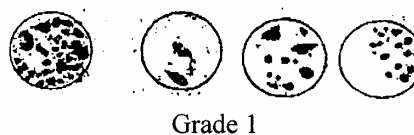
*Typical results for VCI-126 film.

German VIA Test Grades



Picture A.2

- Grade 0: Blind test
No corrosion inhibiting effect
- Grade 1: Blind test
Minute corrosion inhibiting effect
- Grade 2: Blind test
Medium corrosion inhibiting effect
- Grade 3: Blind test
Good corrosion inhibiting effect



FIAT Distance Test

Material	Panel #	Results
EXCOR	1	Very light corrosion / staining
	2	Very light corrosion / staining
	3	Light corrosion / staining
Anticorit	1	Light corrosion
	2	Light corrosion
	3	Light corrosion

FIAT Contact Test

Material	Panel #	Results
EXCOR	1	Very light corrosion
	2	Very light corrosion
	3	Very light corrosion
Anticorit	1	Very light corrosion
	2	No corrosion
	3	Very light corrosion

Conclusions:

1. According to the above test results, the EXCOR film contains BHT (butylated hydroxytoluene) and a high concentration of nitrite. The film provides good contact and vapor protection, but provides poor barrier protection (see F-12 and SO₂ tests).
2. According to the above results, the Anticorit film contains dicyclohexylamine and some nitrite. The film also appears to have some type of coating on it. The Anticorit film provides good barrier protection, but provides very poor vapor protection (see F-12, SO₂ and VIA tests).
3. Both films provide about the same level of corrosion protection for the FIAT distance and contact tests, but the EXCOR test panels from the distance test have some staining.