

# Test Report

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## **Accelerated Weathering Resistance of Oxifree TM198 Coating System – 3000 Hr Exposure Test Result**

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For

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## 1. Report Title:

### Accelerated Weathering Resistance of Oxifree TM198 Coating System – 3000 Hr Exposure Test Result

## 2. Test Method:

The accelerated weathering test is conducted in accordance with ASTM G53 “Standard Practice for Operating Light and Water-Exposure Apparatus (fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials” with a standard cycle of 4 hr UV at 60 °C + 4 hr Condensation at 50 °C. The QUV chamber is shown in Fig 1.



Fig 1 QUV Chamber for the ASTM G53 UV/Condensation Exposure

The coating degradation is represented by the coating flexibility which is measured according to the ASTM D522 “Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings”. The coating flexural strain (flexibility),  $\epsilon$ , is calculated with the following equation.

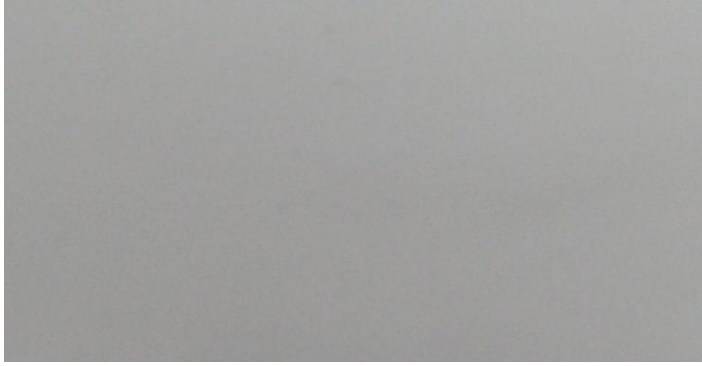
$$\text{Flexural Strain (Flexibility) in \% } \epsilon = \frac{\text{CoatingDFT} / 2}{\text{MandrelRadius} + \text{CoatingDFT} / 2} \times 100$$

## 3. Test Sample

8”x10” Oxifree TM198 test panels of 4 mm thick are prepared by Oxifree Co.

## 4. Test Results

After 3,000 hr exposure to the ASTM G53 UV/Condensation cycles, No chalking can be detected. The sample surface shows a greasy appearance as shown in Figure 3 as a result of oozing out oil. The photos of the sample before and after the 3,000 hr exposure are shown in Figure 2 &3.



**Fig 2 New Oxifree TM198 Sample before UV/Condensation Exposure**



**Fig 3 Oxifree TM198 Sample after 3,000 hr ASTM G53 UV/Condensation Exposure. Oil oozes out to make a greasy surface.**

After 3,000 hr of ASTM G53 UV/Condensation exposure, the test samples are sliced into ¼” wide strips. These strips are bent over a series of fixed radii mandrels. Their flexibility values are measured according to ASTM D522. The test results are compared with the control as listed in Table 1. Some additional flexibility measurements were made in between. We do see some data scattering. For the samples with 0 hr, 1956 hr, and 3005 hr exposure times, the sample was bent on a 0.04” diameter mandrel without cracking. The sample does show a great flexibility.

**Table 1 Test Results of Oxifree TM198 Coating System after 3,000 hr Accelerated UV/Condensation Aging**

Aging Time	DFT	DFT	Flexibility
Hr	in	mm	
0	0.175	4.4	>81%
1000	0.16	4.1	48%
1568	0.1505	3.8	56%
1956	0.1415	3.6	>78%
3005	0.151	3.8	>79%

## 5. Test Summary

Oxifree TM198 Coating System is very flexible with more than 81% flexural strain when it is new. After 3,000 hr accelerating weathering aging test in accordance with ASTM G53 with a standard cycle of 4 hr UV/60C +4 hr

Condensation/50C, the Oxifree TM198 coating material does not chalk and still maintain at least approximately 50% flexibility, which is more than enough to serve as a long term protective coating in a weathering environment.