CLARIANT (NEW ZEALAND) LIMITED
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Clariant New Zealand Laboratory Report

Date:	*16/02/2021*	
Clariant Reference:	*E000040845*	
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Customer Sample ID	Description
R-1	*Customer supplied recycled material*
R+BLK	*Customer supplied material with added MLLBK-9732 (3%)*
R+BLK+UV	*Customer supplied material with MLLBK-9732 (3%) and MLLNA-0374 (1%)*

Objective

Compound the supplied material at the suggested ratios.
Stabilise their recycle with 3% MLLBK-9732 and 4% MLLBK-9732 + 1% MLLNA-0734
Injection mould the compound into impact bars.

Test Plan:

- *Injection mould each sample into tensile, flexural and Izod impact test bars.*
- *QUV Analysis using Clariant NZ standard conditions as per ISO 4892-3 Cycle 2 – UV/Spray/condensation:*
    - *Lights on @ 60˚C with an irradiance of 0.76 W/m²*
    - *Samples will be removed from the QUV at the following time periods for colour testing:*
        - *1000 hours – 10000 hours.*
        - *Every 1000 hours is equivalent to 217 days outdoors in NZ.*
- *Measure the IZOD impact resistance, as per ASTM D-180 standard conditions.*

Results:

The results are displayed in Appendix A.

Discussion:

The results indicate that after 5000 hours of accelerated weathering the sample R-1 displayed a significant drop in impact strength. After the same time period, the sample R+BLK displayed a slight increase of the impact strength, which may be due to the nucleating effect on crystallinity of the UV light. Further testing resulted in a greater drop in impact strength of the R-1 sample. The R-1 sample also displayed significant surface degradation (figure 1 and 4). Overall the R+BLK+UV sample displayed the highest impact strength after a total of 10000 hours of testing.

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Appendix A:

UV, hours	R-1		R+BLK		R+BLK+UV	
0	**53.75**	±5.04	**58.48**	±1.96	**61.81**	±3.27
1000	**51.0**	±5.12	**61.9**	±2.5	**62.28**	±2.82
2000	**50.71**	±1.64	**64.16**	±2.25	**64.65**	±1.63
4000	**42.11**	±2.01	**65.32**	±3.13	**61.25**	±1.80
5000	**40.69**	±0.57	**65.59**	±1.58	**48.67**	±5.17
6000	**37.75**	±1.79	**66.30**	±2.30	**64.59**	±3.12
7000	**34.33**	±1.60	**66.24**	±3.18	**63.98**	±2.18
8000	**30.48**	±5.70	**65.26**	±3.63	**65.71**	±3.11
10000	**29.90**	±5.03	**63.54**	±2.77	**64.46**	±1.83

Table 1. Impact strength (kJ/m²) of the samples.

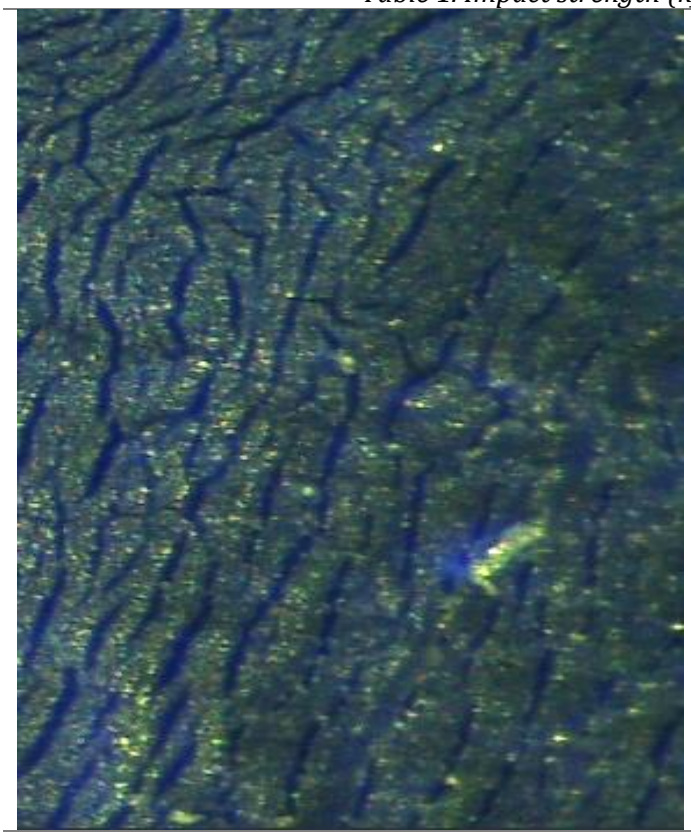

Image 1. Surface of the R-1 sample after 5000 hours.

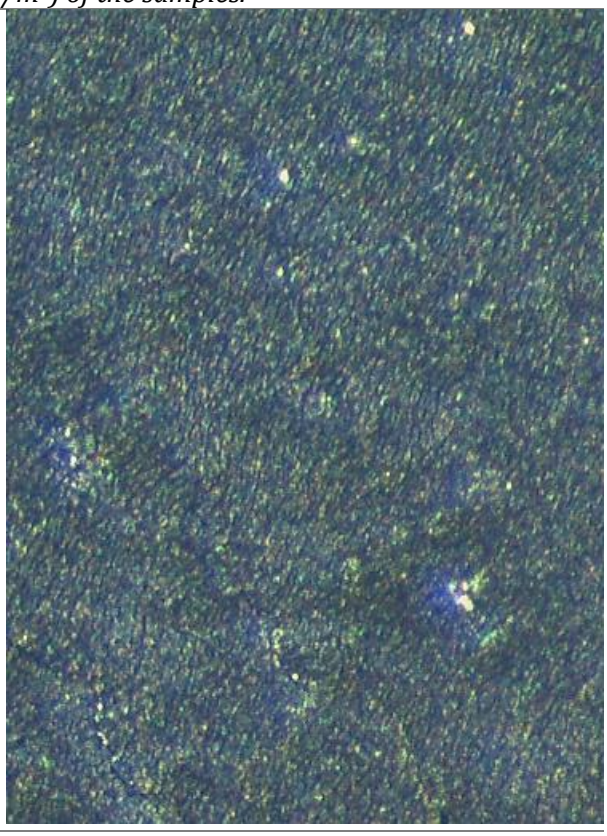

Image 2. Surface of the R+BLK sample after 5000 hours.

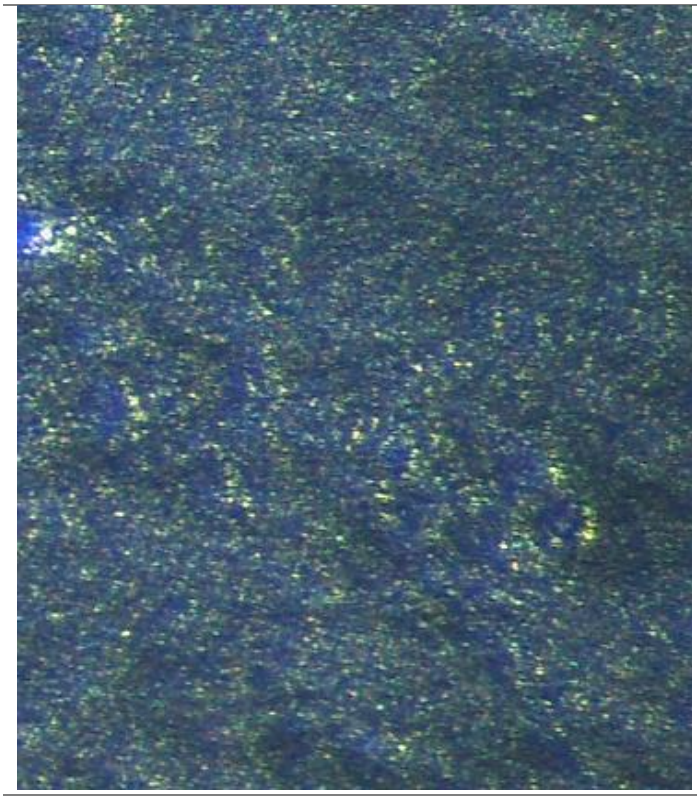

Image 3. Surface of the R+BLK+UV sample after 5000 hours.

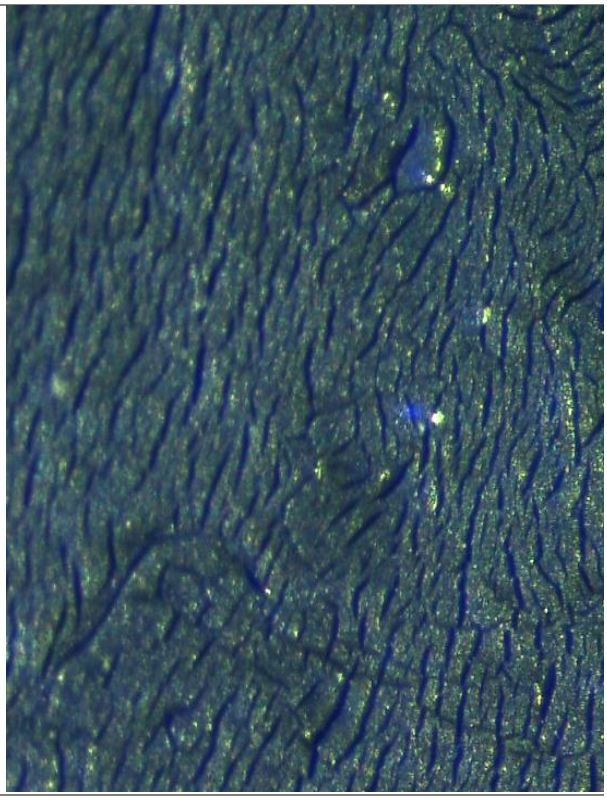

Image 4. Surface of the R-1 sample after 10000 hours.

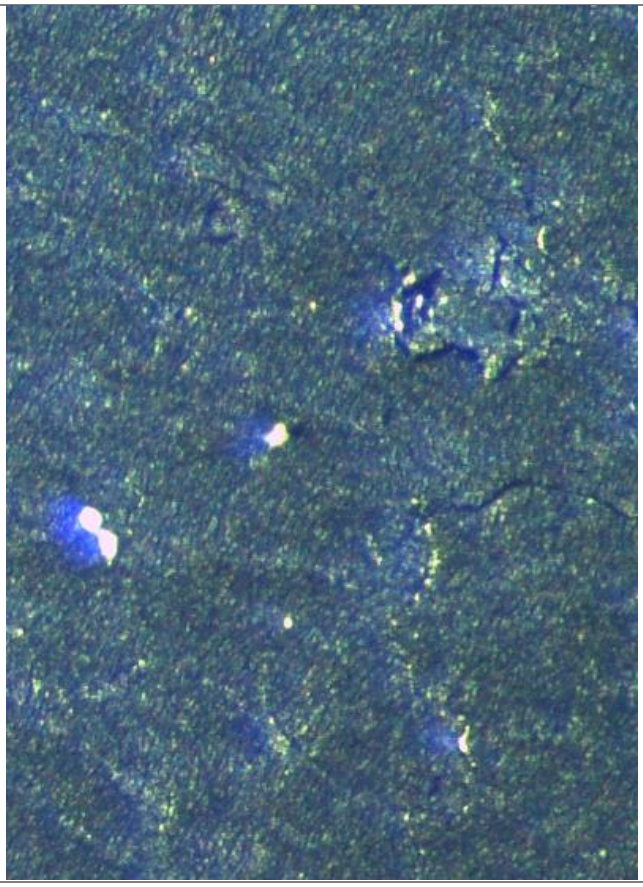

Image 5. Surface of the R+BLK sample after 10000 hours.

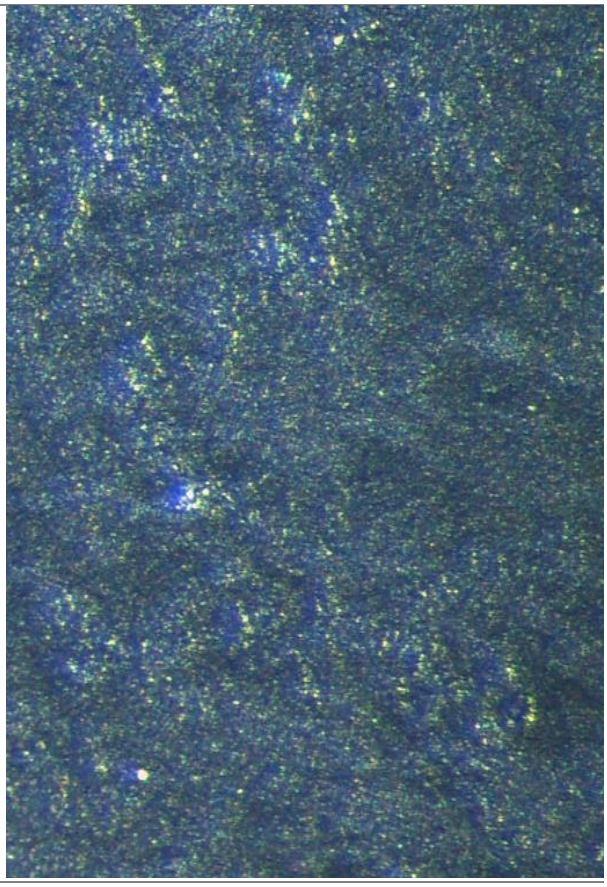

Image 6. Surface of the R+BLK+UV sample after 10000 hours.