

# Technical Report

## QUV Accelerated Weather Testing

<b>TR-0002302-7   QUV Accelerated Weathering Performance Testing</b>	<b>Date:</b> 21 December 2023
<b>Assessment of Aralox-FL170 and Metalox-GC450</b>	<b>Document Number:</b> TR-0002302-7

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## Executive Summary

The colour change is tabulated below for all products tested after 1000 hours.

Tabulated data for the series						
System	QUV Hours	dL*(D65)	da*(D65)	db*(D65)	dE*ab(D65)	Visual Comment
GC450 / S30 White (24 Hrs)	1000 Hrs	-0.15	0.03	0.37	0.4	No colour change Visually
GC450 / S30 White (3 Days)	1000 Hrs	-0.29	0	0.38	0.48	No colour change Visually
FL170 / FL170 Mid Grey (24 Hrs)	1000 Hrs	-1.32	0.24	16.36	16.41	Yellower
Metalox-GC450	1000 Hrs	-7.77	5.65	3.61	10.26	Darker, yellower, redder

The following conclusion is drawn from the results.

- All our epoxies will turn yellow on exposure to sunlight.
- Opalon-S30, Opalon-F45, Opalon-W45 and PU75 all had no visual change in colour or gloss
- The Opalon-S30 has a 3-day recoat window when applied over Metalox-GC450 and is not exposed to UV.
- None of the samples experienced high levels of DFT loss.

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QUV Accelerated Weather Testing

## Introduction

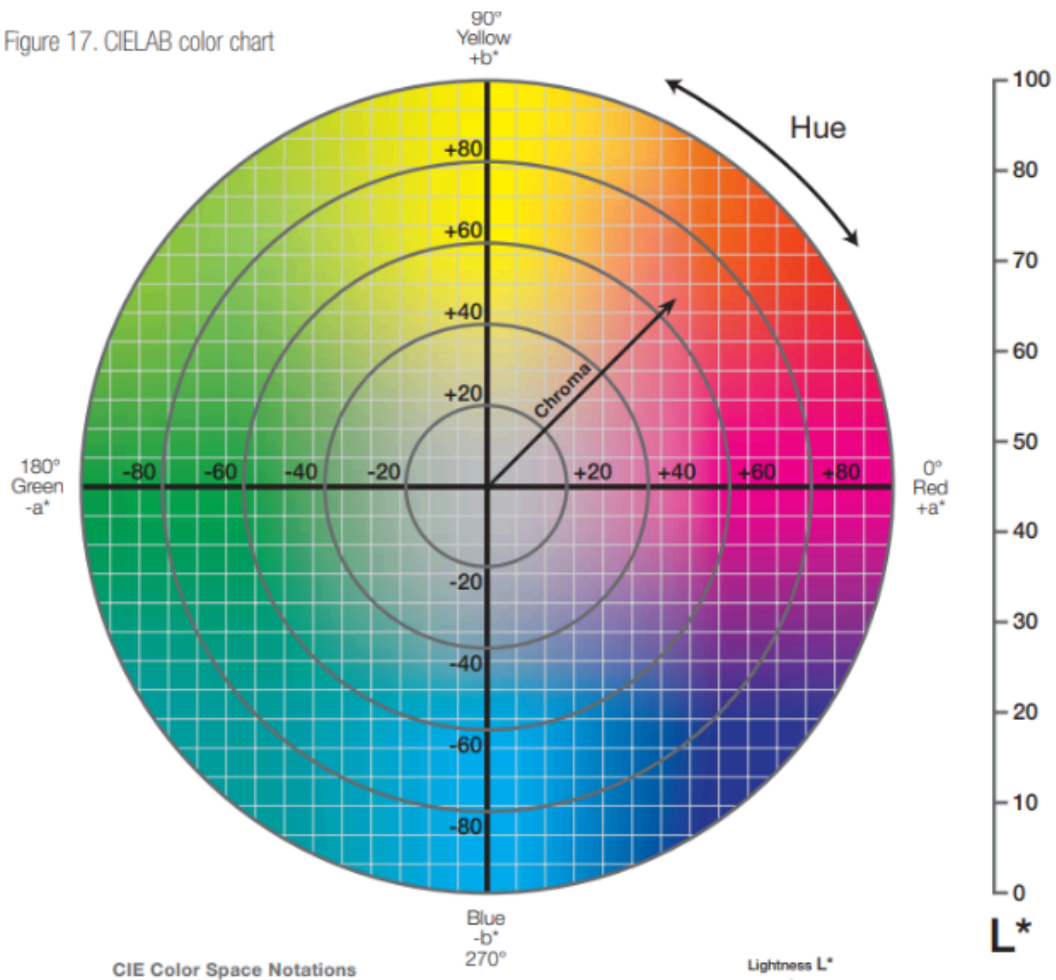
This technical report assesses the colour change, gloss change, and DFT loss after 1000 hours of accelerated weathering to ASTM D154 Cycle 1. The list of test panels in the series is tabulated in panel preparation

## Assessment

### Colour

The colour will be assessed using a spectrophotometer (Konica Minolta). Any colour data will be supported by a visual assessment of a colour matcher.

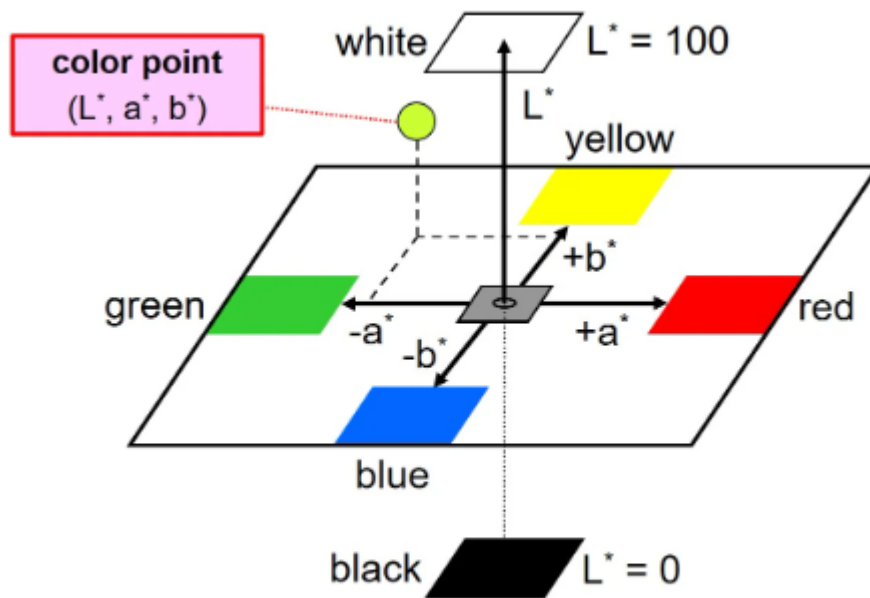
Figure 17. CIELAB color chart



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CIELAB is a three-dimensional system that triangulates and precisely defines any colour point. The initial colours of all the samples are scanned to create the standard reference. The samples are rescanned after weathering (250, 500, 750, and 1000 Hours of weathering in the QUV) to determine the changes in colour.



*The 3-dimensional CIELAB color space.*

### CIE Colour Space Notations

dL*(D65)	difference in lightness / darkness value	"+" = lighter "-" = darker
da*(D65)	difference on the red / green axis	"+" = redder "-" = greener
db*(D65)	difference on the yellow / blue axis	"+" = yellower "-" = bluer
dE*(D65)	total colour difference value	

The d or delta describes the change in colour rather than an actual colour. The dL number indicates a change in light or dark colour. The da number indicates a change in green or red, and the db indicates a change in blue or yellow. The delta (dL, da and db) numbers indicate how the colour has changed from the original colour scan. dE is the visual difference between the two colours.

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### Panel Preparation

System 0001/01 (GC450/S30/24 Hours)

Metalox-GC450 White	250µm DFT	24 Hour recoat
Opalon-S30 - White	75µm DFT	

System 0001/02 (GC450/S30/3 Days)

Metalox-GC450 White	250µm DFT	3 Days recoat
Opalon-S30 - White	75µm DFT	

System 00010/01 (FL170/FL170/24 Hours)

Aralox-FL170 Mid Grey	100µm DFT	24 Hour recoat
Aralox-FL170 Mid Grey	100µm DFT	

System 00011/01 (GC450)

Metalox-GC450 White	250µm DFT	
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## QUV Accelerated Weather Testing

### Results

#### Metalox-GC450 / Opalon-S30 - 24 Hour Recoat

System 0001/01 (GC450/S30/24 Hours)

Opalon-S30 White has not visually changed colour after 1000 hours of weathering (ASTM D154 Cycle 1). The dry film thickness has not changed.

System	QUV Hours	dL*(D65)	da*(D65)	db*(D65)	dE*ab(D65)
Metalox-GC450 / Opalon-S30 White (Recoat 24 Hrs)	0 Hrs	0.00	0.00	-0.01	0.01
	250 Hrs	0.09	0.02	0.32	0.33
	500 Hrs	-0.03	-0.03	0.47	0.48
	750 Hrs	0.03	-0.02	0.34	0.35
	1000 Hrs	-0.15	0.03	0.37	0.40

System	QUV Hours	Gloss
Metalox-GC450 / Opalon-S30 White (Recoat 24 Hrs)	0 Hrs	66.6
	1000 Hrs	68.1



<https://liquimix.com/opalon-s30>

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## QUV Accelerated Weather Testing

### Metalox-GC450 / Opalon-S30 - 3 Days

System 0001/02 (GC450/S30/3 Days)

Opalon-S30 White has not visually changed colour after 1000 hours of weathering (ASTM D154 Cycle 1). The dry film thickness has not changed.

The recoat window for Opalon-S30 over Metalox-GC450 not exposed to UV is 3 Days.

System	QUV Hours	dL*(D65)	da*(D65)	db*(D65)	dE*ab(D65)
Metalox-GC450 / Opalon-S30 White (Recoat 3 Days)	0 Hrs	0.01	0.00	0.01	0.01
	250 Hrs	-0.19	0.01	0.32	0.38
	500 Hrs	-0.30	-0.06	0.61	0.68
	750 Hrs	-0.11	-0.03	0.42	0.43
	1000 Hrs	-0.29	0.00	0.38	0.48

System	QUV Hours	Gloss
Metalox-GC450 / Opalon-S30 White (Recoat 3 Days)	0 Hrs	67.3
	1000 Hrs	66.7



<https://liquimix.com/opalon-s30>

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### Aralox-FL170 Mid Grey / Aralox-FL170 Mid Grey - 24 Hours Recoat

System 00010/01 (FL170/FL170/24 Hours)

The Aralox-FL170 Mid Grey has significantly changed colour after 1000 hours of weathering (ASTM D154 Cycle 1). The colour has yellowed visually. The spectrophotometer detected the colour changing to yellow. The significant shift to a yellow colour occurred within the first 500 hours and then became a more stable colour. The gloss has dropped off to a matte level.

System	QUV Hours	dL*(D65)	da*(D65)	db*(D65)	dE*ab(D65)
Aralox-FL170 Mid Grey / Aralox-FL170 Mid Grey (Recoat 24 Hrs)	0 Hrs	0.00	0.01	-0.01	0.02
	250 Hrs	-1.75	-0.91	8.66	8.88
	500 Hrs	-3.38	-0.11	16.95	17.28
	750 Hrs	-1.84	0.19	16.73	16.83
	1000 Hrs	-1.32	0.24	16.36	16.41

System	QUV Hours	Gloss
Aralox-FL170 Mid Grey / Aralox-FL170 Mid Grey	0 Hrs	106.0
	1000 Hrs	1.4



<https://liquimix.com/Aralox>

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## QUV Accelerated Weather Testing

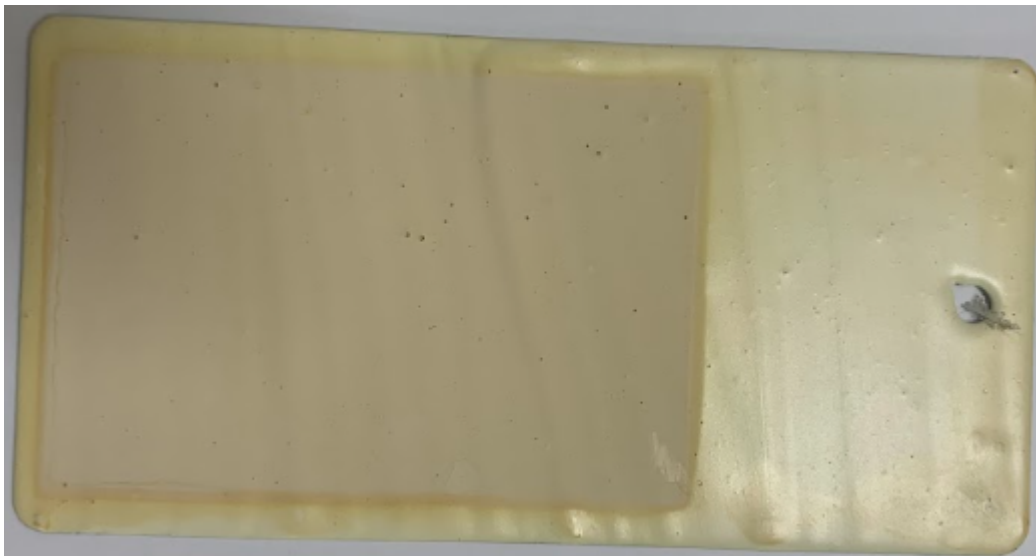
### Metalox-GC450

System 00011/01 (GC450)

The Metalox-GC450 White has significantly changed colour after 1000 hours of weathering (ASTM D154 Cycle 1). The Metalox-GC450 White colour has darkened and yellowed visually. The spectrophotometer detected the colour changing to a darker yellow colour. The significant shift to a beige colour occurred within the first 250 hours and then became a more stable colour. The gloss has dropped off to matte level.

System	QUV Hours	dL*(D65)	da*(D65)	db*(D65)	dE*ab(D65)
Metalox-GC450	0 Hrs	0.00	-0.01	-0.01	0.01
	250 Hrs	-7.94	4.96	11.51	14.84
	500 Hrs	-7.57	5.50	6.31	11.29
	750 Hrs	-7.60	5.54	4.93	10.62
	1000 Hrs	-7.77	5.65	3.61	10.26

System	QUV Hours	Gloss
Metalox-GC450	0 Hrs	15.8
	1000 Hrs	1.6



<https://liquimix.com/metalox-gc450>

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## QUV Accelerated Weather Testing

### Conclusion

The following conclusions are drawn from the above results.

The following conclusion is drawn from the results.

- All our epoxies will turn yellow on exposure to sunlight.
- Opalon-S30 had no visual change in colour or gloss
- The Opalon-S30 has a 3-day recoat window when applied over Metalox-GC450 and is not exposed to UV.
- None of the samples experienced high levels of DFT loss.



### Bryant Wells

B Chem Sc, MBA, Certified NACE 3  
Technical Manager

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