



Identimark

U3

ACCELERATED TESTING REPORT

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U3 SIGNAGE ACCELERATED WEATHER TESTING

Identimark is pleased to report that our U3 signage is undergoing accelerated weather testing at the Allunga Exposure Laboratory in Townsville, Northern Queensland. We are particularly interested in how the fade free properties of U3 signage perform under some of the highest naturally occurring UV radiation levels on Earth.

BACKGROUND ON THE ALLUNGA EXPOSURE LABORATORY

Allunga Exposure Laboratory is an NATA accredited laboratory. They use the natural spectrum of light provided by the sun rather than artificial light sources to conduct their testing. This gives a more realistic simulation of natural weathering. They are one of the few independent laboratories worldwide conducting testing of this type. Allunga has over 40 years of expertise in this area. Their testing is in accordance with ISO, ASTM, AS/NZS, JIS, DIN, TNO and several other national and international specifications.

WHY IS THE LABORATORY IN TOWNSVILLE?

Townsville has one of the highest average UV radiation levels on Earth. This greatly affects the rate of weathering acceleration. The geographic location of Townsville is the influencing factor which affects the climate and UV levels.

CLIMATE

Allunga Exposure Laboratory is positioned at 19°S and 147°E. This places it well within the Tropic of Capricorn. The climate of Townsville is tropical with an average daily temperature range of 20°C - 29°C. The average annual sunshine hours is 3110 hours per annum (to put it into perspective; the average daily sunshine hours are 8.7 hours.) This equates to an average of 310 days of sunshine a year. The average annual rainfall is 1145mm with a daily humidity range 65 - 75%. (See appendix A) Townsville has little seasonal differences due to its position in the Tropics.

UV RADIATION

The main factors causing the high UV radiation levels at Allunga Laboratory, in order of importance, are:

- **High solar elevation** (how high the sun is in the sky). Solar elevation is what causes the change in seasons. Townsville being in the Tropic of Capricorn has little variation in solar elevation throughout the year.
- **High sunshine hours.** Townsville has an average of 3110 hours of sunshine a year. This means the test samples are exposed to UV radiation for the majority of the testing process. Cloudy weather can reduce the UV Index (UVI) by up to 90%. Even in midwinter, Townsville still has a UVI of 6.



- **Ozone depletion.** Ozone in the atmosphere absorbs UV radiation. There is less ozone in the area of the tropics (less than half the amount at mid-latitudes) to absorb the UV rays.
- **The elliptical orbit of the sun.** The Earth's orbit around the sun is not perfectly circular. The distance between the sun and Earth varies throughout the year. The Earth is closest to the sun in early January which is mid-summer in Townsville.

Townsville is in the ideal position for weather testing involving UV exposure. According to NIWA Peak UV should occur within the tropics (high sun, low ozone), at a high altitude site in the Southern Hemisphere. Near the Tropic of Capricorn, overhead Sun occurs during the period when the Earth-Sun separation is a minimum.

HOW DOES ALLUNGA LABORATORY DO ACCELERATED WEATHER TESTING

Allunga Laboratory uses several types of testing methods depending on the length and type of exposure required. The U3 samples are undergoing ALTRAC testing.

AI TRAC TESTING

AL TRAC units track the sun using Fresnel-like arrays of ten mirrors to multiply radiation.

The units focus the sun's rays onto the test samples. They rotate on two axis to maximise radiation. Fans are used to regulate the surface temperature. These units allow the samples to be exposed to condensation and other natural moisture as the units reposition themselves as the sun sets. The climatic conditions of Townsville act to impose an upper limit on the acceleration rate as possible. The long term acceleration rate is approximately 5 times that of the 'fixed rack' exposure testing (test samples are fixed in the same position throughout the testing process) at Townsville. This is significantly higher than most other parts of the world.

WHAT ARE THE RESULTS FOR OUR U3 SAMPLES SO FAR?

The U3 samples have been exposed to the **equivalent of over 40 years**.

So far the samples have showed little change in their general appearance. Allunga Laboratory reports on and measures: general appearance, washed change of gloss, colour change, checking, cracking, blistering and distortion. They give each sample a rating; 0 being no change and 5 being complete change.

Allunga has given all U3 samples currently exposed a rating of 0 or 1. There are trace changes in colour and no change in checking, cracking, blistering or distortion.

In conclusion, U3 signage is undergoing some of the harshest UV radiation exposure on Earth. Using the testing methods provided by Allunga Exposure Laboratory we seek to test the long term weathering, in particular the fading effects on U3 signs using the natural spectrum of the radiation provided by the sun. We believe this testing will provide is the best simulation of natural weathering effects.



Allunga Exposure Laboratory

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WEATHER SUMMARIES 1970 ~ 2008

	Temperature Ambient		Mean (°C) Dew Point		Relative Humidity Mean (%)		Rain	Evap	Wet Time	Sun Shine	Global Radiation (MJ/m ²) UV-R		
	Max	Min	Sam	Spm	Sam	Spm	mm	mm	Hours	Hours	Hortz	19°N	Hortz
2008	29	20	18	19	64	78	1860.8	2493	2648	3087	6993	7226	398.9
2007	29	20	18	20	65	76	1533.5	2443	2841	3109	7008	7268	428.4
2006	29	20	18	19	64	75	834.8	2440	2691	3048	7092	7227	422.7
2005	30	21	18	19	62	74	638.4	2708	2791	3238	7668	7887	430.9
2004	30	20	18	19	62	75	908.7	2509	3105	3180	7728	7979	430.3
2003	30	21	18	19	61	72	503.2	2725	2206	3389	7958	8188	455.9
2002	30	20	17	19	60	74	730.1	2693	2589	3585	7867	8122	463.0
2001	30	20	17	19	61	76	496.8	2403	2963	3393	7577	7852	420.4
2000	29	19	18	19	68	80	2258.9	2136	3672	2894	6892	7123	309.1
1999	29	20	18	19	66	78	1060.7	2203	3263	2928	6945	7223	276.5
1998	29	21	20	20	69	80	2243.6	2196	3894	2974	6937	7168	280.0
1997	29	20	17	19	64	77	1601.4	2426	3161	3102	7191	7458	329.3
1996	31	20	18	19	64	75	858.1	2592	2552	3275	7326	7589	353.1
1995	30	21	18	19	65	74	928.4	2613	2821	3188	7186	7419	346.7
1994	29	20	17	18	62	73	550.6	2807	2312	3515	7465	7721	366.9
1993	29	20	18	19	66	75	548.3	2642	2779	3206	7224	7496	365.0
1992	29	20	*	*	65	74	561.3	2649	2805	3273	7432	7655	*
1991	29	20	*	*	68	76	1842.3	2379	3824	3124	7148	7711	*
1990	29	20	*	*	66	74	1808.0	2527	4229	3223	7273	7431	*
1989	28	20	*	*	67	77	1242.3	2308	4037	2967	7058	7095	*
1988	30	21	*	*	64	72	976.8	2676	3302	3088	7532	7723	*
1987	29	21	*	*	64	74	951.8	2896	3019	3179	7480	7707	*
1986	29	21	*	*	65	75	648.3	2654	3160	3050	6955	7144	*
1985	29	20	*	*	66	75	629.6	2696	2846	3085	7186	7420	*
1984	29	20	*	*	66	75	961.1	2544	2775	3070	7043	7292	*
1983	29	21	*	*	66	74	791.0	2728	2777	3126	6962	7169	*
1982	29	19	*	*	65	73	691.1	2663	3009	3337	7396	7670	*
1981	29	20	*	*	70	76	1761.4	2373	3726	2991	6986	7260	*
1980	29	20	*	*	67	73	721.4	2714	3198	3230	7760	8004	*
1979	29	20	*	*	67	75	1023.7	2797	3037	3132	7694	7972	*
1978	29	20	*	*	67	73	1071.2	2634	2605	3106	7497	7544	*
1977	29	19	*	*	67	74	1319.8	2637	2830	2948	7262	7269	*
1976	29	20	*	*	66	76	1384.2	2622	3048	3044	7070	7135	*
1975	29	20	*	*	69	73	1447.3	2410	2739	2763	6827	7021	*
1974	29	20	*	*	67	72	1716.2	2428	3523	2819	7004	*	*
1973	29	21	*	*	68	73	1529.2	2570	2570	2574	7057	*	*
1972	29	19	*	*	63	71	1090.2	2797	*	3022	7607	*	*
1971	30	20	*	*	65	73	2224.5	2738	*	2999	7555	*	*
1970	29	20	*	*	64	72	719.8	*	*	3045	7510	*	*
Average	29	20	18	19	65	75	1145.4	2565	3037	3110	7291	7505	379.8

For further information please contact Allunga Exposure Laboratory
 UV data recorded by Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)

For more information:

U3 signs www.identimark.com/U3
 Allunga Exposure Laboratory www.allunga.com.au

- 1 National Association of Testing Authorities
- 2 National Institute of Water and Atmospheric Research
- 3 Liley, J Ben & McKenzie, Richard L Where on Earth has the highest UV? www.niwa.co.nz
- 4 Allunga Exposure Laboratory, Exposure & Reporting Services