

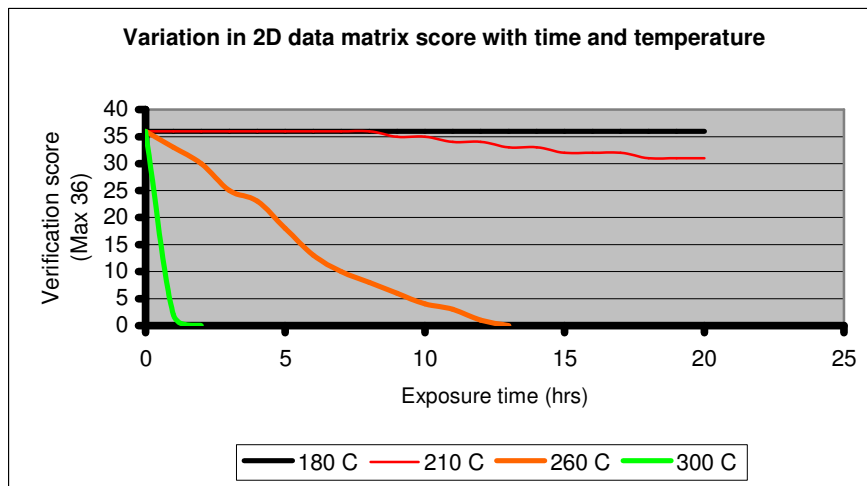


Permanence Testing of UID UK 2D Data Matrix Codes

The long- term durability of our 2D data matrix machine readable codes has been assessed against the effects of temperature, abrasion, exposure to various chemicals/liquid products and sunlight. The UID UK test specimens from which all measurements and observations are taken are retained in specimen folder UIDUK/Prim/2D/01.

Temperature

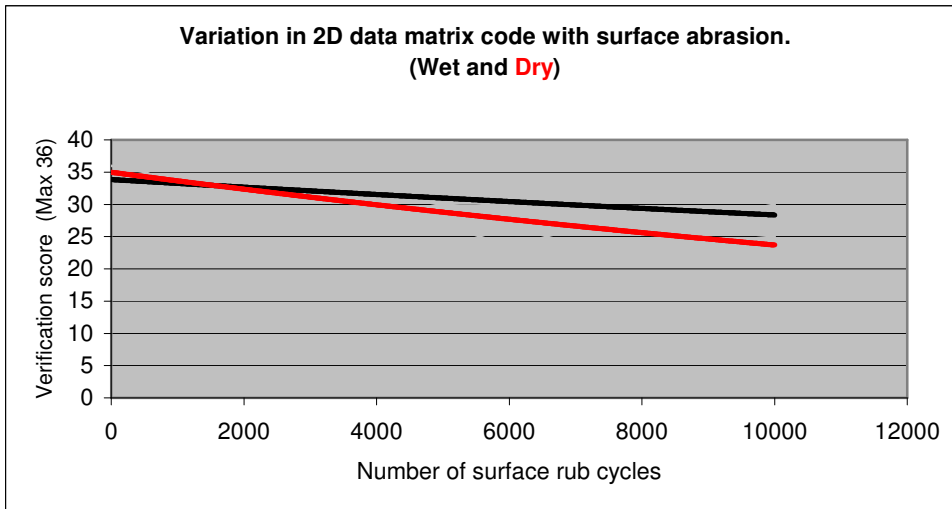
The readability/time graph below demonstrates no effect on machine readability at temperatures up to 180 Centigrade for periods of up to 20 hours. Increasing temperature beyond this affects the code to various degrees depending on length of exposure.



Verification score is based on the cumulative value of measurements taken at all nine light angle settings for MIL-STD-130N for Direct Part Marking on a black UID code using a Siemens UID compliance verifier.

Abrasion

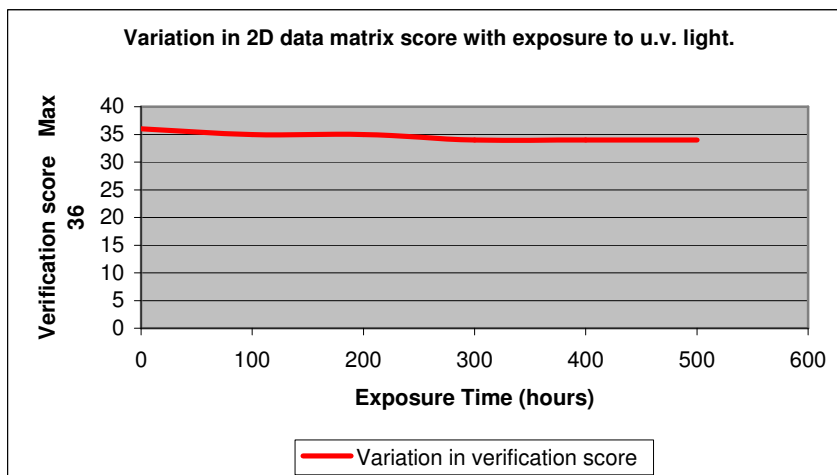
The readability/abrasion cycle graph below demonstrates that extensive dry and wet abrasion has only a slight effect on machine readability.



Verification score is based on the cumulative value of measurements taken at all nine light angle settings for MIL-STD-130N for Direct Part Marking on a black UID code using a Siemens UID compliance verifier. All rub testing has been carried out using 3M grade 401Q sandpaper with aviation hydraulic fluid as the "wet" medium.

Light Fastness

Samples of black 2D data matrix codes have been exposed for 500 hours in an Alpas Suntest accelerated weathering chamber producing the following verification rating graph.



Verification score is based on the cumulative value of measurements taken at all nine light angle settings for MIL-STD-130N for Direct Part Marking on a black UID code using a Siemens UID compliance verifier.

Chemical Resistance

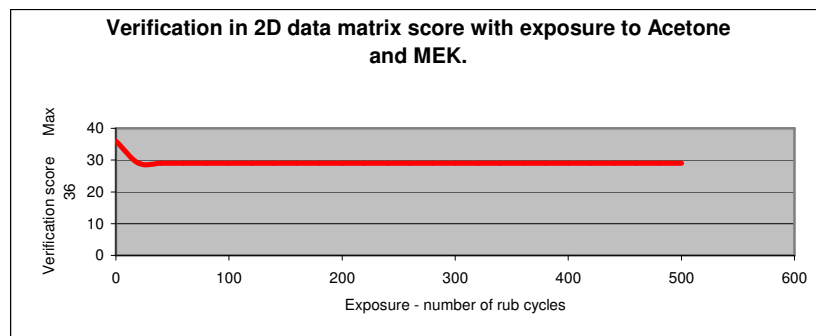
The following chart demonstrates the visual impact of exposure to a range of environmental hazards. Assessment has been made against both the overall impact on all colours on the sample under test and specifically against black from which the 2D data matrix code is produced.

PRODUCT OR CHEMICAL	ALL COLOURS	BLACK ONLY
Aviation Hydraulic Fluid	●	●
Automotive Grease (Lithium based)	●	●
Acetone	●	●*
Household Bleach (20% solution)	●	●
Acid based Degreaser ((Sulphuric/hydrofluoric acid)	●	●
Isopropyl Alcohol	●	●
White Spirit	●	●
W.D. 40 Oil	●	●
Caustic Metal Cleaner (Sodium hydroxide/hyperchlorate)	●	●
Petrol	●	●
Methyl Ethyl Ketone	●	●*
Alkali based Degreaser (10% solution)	●	●
Metal Cleaner (Hydrocarbon based)	●	●
Coca Cola (Phosphoric Acid)	●	●

NO CHANGE SLIGHT CHANGE MODERATE CHANGE SIGNIFICANT CHANGE
 ● ● ● ●

Chemical resistance has been established by rubbing the surface of the product forty times with an absorbent fibrous wipe soaked in the respective liquid and visually assessing against the above criteria.

* The verification score for the 2D data matrix codes for acetone and MEK was 29. It should also be noted that extending the test to 500 surface rubs showed no further deterioration in verification score as demonstrated below.





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