How do you Know if Your White-Surface HDPE Geomembranes Will Last Under Strong UV ?

By GNA Editor 4th November 2024

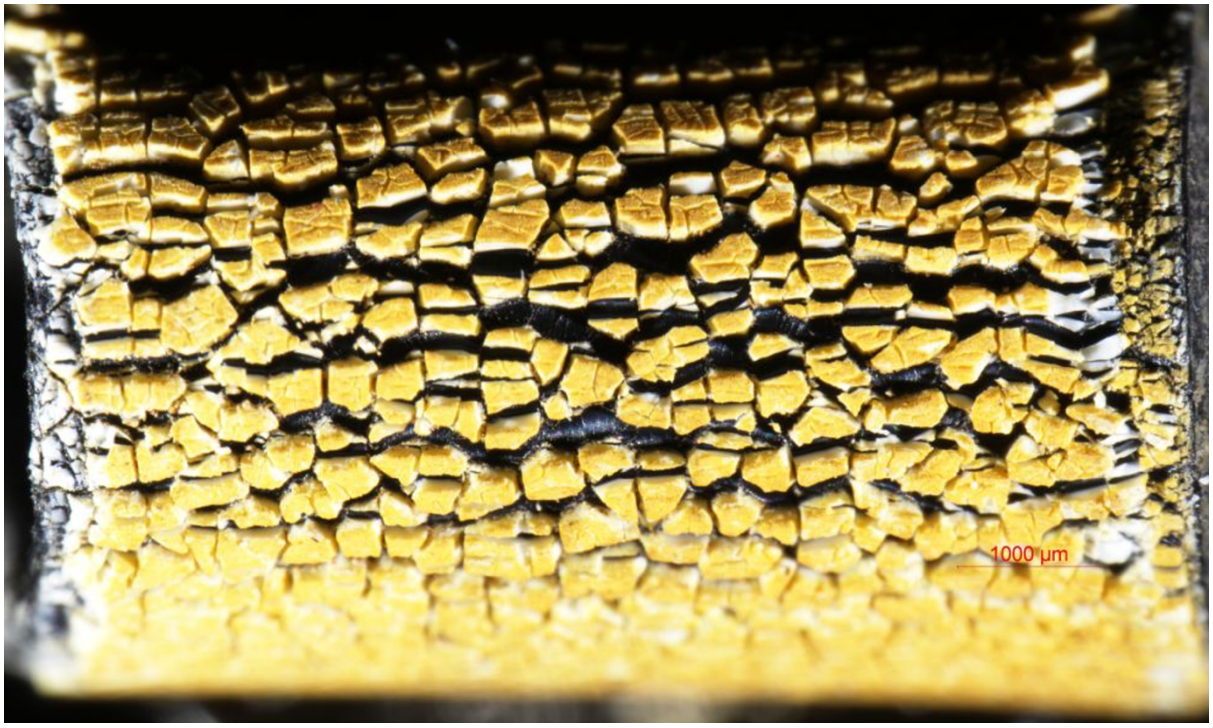
As Seen In:

GNA
GEOSYNTHETIC NEWS ALERTS

The white surfaced HDPE layer is extruded concurrently with the black base HDPE geomembrane forming an integral part of the liner. The white surface is highly effective in reducing the energy absorbed through radiation and hence the temperature of the liner in exposed conditions is markedly reduced.

Reducing the temperature of the liner has many advantages including reducing the rate of thermal oxidation of the liner, reducing the derating of mechanical properties due to elevated temperature effects and reducing thermal expansion and contraction and in turn reducing damaging cyclic stresses on the welded seams.

However the white layer is more difficult to properly stabilize and protect from damaging UV radiation than black HDPE. Under the harsh Australian sun, the white layer on HDPE geomembrane can degrade and embrittle as shown in the photograph below.



How to Ensure your White HDPE Geomembranes Going to Last ?

By meeting the following criteria your white HDPE will have excellent performance in harsh exposed conditions:

[1] Proper Additives: For weathering resistance it is recommended minimum 0.3% Hindered Amine Light Stabiliser (HALS) as TINUVIN 783 and a minimum of 3% Coated (durable) Rutile TiO_2.

TINUVIN 783 is a synergistic mixture of oligomeric hindered amine stabilizers namely 50%HALS 944 + 50%HALS 622.

The minimum default concentration for HALS is 3000 ppm (0.3%) minimum as Tinuvin 783. Other HALS compounds and HALS compounds from alternative suppliers or alternative concentrations of HALS may be used if it can be demonstrated that the outcome is equivalent or superior to that achieved with the default specification.

[2] Proper Dispersion: When tested in accordance with AS/NZS 1462.28, the rating of appearance shall be not worse than Micrograph B in Annex B of AS/NZS 1462.28, and the arithmetic average of the maximum sizes of pigment agglomerations or foreign bodies shall not exceed 60 µm (corresponding to Grade 3 of AS/NZS 1462.28).

ExcelPlas Labs use a combination of NMR analysis, x-ray diffraction analysis and scanning optical microscopy (SOM) to ensure the correct HALS and the correct coated rutile white pigment are present at the correct concentration and correct degree of dispersion.