THE LONGEVITY OF BENTONITE WATERPROOFING

Bentonite waterproofing has been used successfully for more than 50 years and has proven not to be susceptible to long-term chemical or biological degradation in typical groundwater conditions. With respect to the bentonite component, this mineral is tens of millions of years old and will not undergo any structural changes under normal conditions of environmental exposure. Biological degradation is not possible because bentonite is an inorganic mineral of no nutritional value to microorganisms. With regards to chemical degradation, CETCO treats the sodium bentonite with chemical additives to resist chemical degradation. And for quality assurance CETCO performs a laboratory test on actual site groundwater to assess and confirm the suitability of the product for the specific site conditions.

Geotextiles and geomembranes used in CETCO's products are made from polypropylene, polyethylene, and polyvinylchloride which are extremely durable polymers that are also highly resistant to chemical, physical, or biological degradation. The reason for this durability is the stable molecular structure of these molecules, which consist of multiple carbon-carbon bonds. Long-term degradation would involve the breakage of these bonds, a process requiring a large amount of initiation energy not available in a subsurface environment. Based on these structural considerations and the results of a variety of field studies, there is a consensus amongst the scientific community that geosynthetic materials such as geotextiles and geomembranes are stable in the very long term when buried and undisturbed. Koerner (1990) presents the results of several studies of geotextiles under conditions of soil burial which have consistently indicated that they have remained in “good to excellent” condition. Another study by Tisinger (1989) showed no degradation of the physical properties of a polypropylene geotextile buried for 11 years. Ivy (2002) reported similar results for a polyethylene geomembrane.

In addition to these field studies, extensive compatibility tests (via EPA Method 9090) have been conducted in which polypropylene geotextiles were immersed in biologically active liquids. This testing, conducted at elevated temperatures to accelerate degradation, showed no changes in tensile strength or puncture resistance over a 120-day test period (Polyfelt, 1992). The only mechanism by which polypropylene geotextiles have been shown to degrade is prolonged exposure to sunlight (UV degradation). However, waterproofing products are covered soon after installation, such exposure is not possible and UV degradation cannot occur.

Based on the research performed on polypropylene geotextiles, it appears they are not susceptible to biological or physical degradation under the conditions of soil burial. The bentonite component, as used in Voltex products, is also unlikely to be degraded due to its inorganic composition and its inherently stable mineral structure. Based on this information it is concluded that bentonite waterproofing materials are sufficiently durable to function effectively long-term to protect the building from water ingress.

References

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