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Geosynthetic materials such as geomembranes and geosynthetic clay liners (GCLs) are frequently used in composite clay liners for landfills. In line with ASTM recommendation the clay portion of a GCL should be tested for chemical compatibility to liquids. A series of mineral composition, swell index, fluid loss and water absorption capacity tests of bentonite were conducted. The site-specific liquid i.e. real leachate was collected from the leachate retention basin of a municipal solid waste disposal site Jakuševac near Zagreb.

Besides the baseline testing performed on "as-received" samples (series I), three other series of tests were also made. GCLs mineral component (bentonite) was immersed into the leachate during different periods of time for two series (II and III), after what index tests were performed using demineralized water as a test fluid. The last series of experiments (series IV) was conducted using the site specific liquid as a test fluid.

Water absorption test results are shown in Fig. 1. The results indicate the decrease of absorption capacity with the increase of sample immersion time into the leachate: the longer immersion period, the smaller absorption capacity.

Test results for fluid loss yield no significant difference in values obtained with "as-received" samples in comparison with samples immersed into the site specific liquid.

Free swell test results are shown in Table 1. The results for samples immersed into the site specific liquid (series II and III) show the increase of swell index with the duration of immersion comparing to baseline testing (series I). On a contrary, the tests performed with site specific liquid as test fluid (series IV) show much lower swell index.

Mineral composition has been determined by X-ray powder diffraction (XRD). XRD analyses indicate that the sample contains about 75% of clay minerals with majority of the minerals being smectite. The change of basal spacing is noticed for samples immersed into the leachate. It is also interesting to note that these changes occurred immediately after immersion because the results of series II (7 days) and series III (60 days) do not show almost any difference.

XRD analysis and index tests conducted on specimens immersed into the site specific leachate during different periods of time showed some influence of leachate to the bentonite behaviour. However, swell index tests conducted using the site specific leachate as a test fluid showed significant influence of leachate to the bentonite.

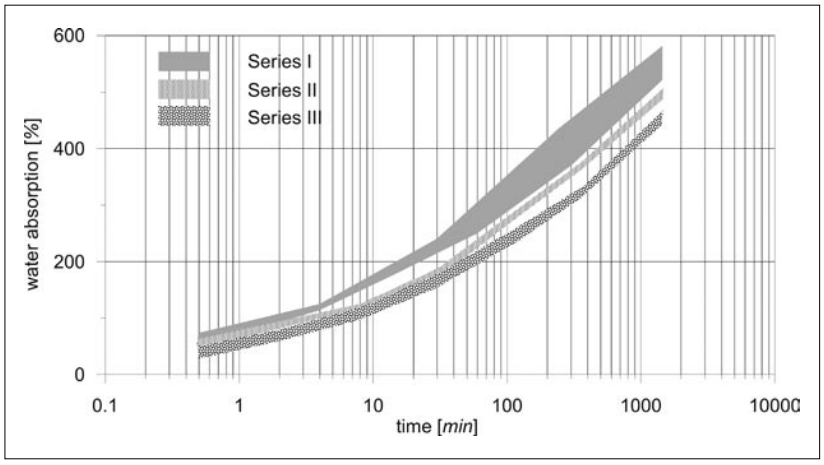

Fig. 1 Water absorption capacity.

Table 1 Swell index [ml/2g]. Legend: series I ("as-received"); series II (immersion time – 7 days); series III (immersion time – 60 days); series IV (leachate as test fluid).

Sample no.	Series I	Series II	Series III	Series IV
1	34	35	44	16
2	33	34	43	16.5
3	34	34	43	16

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