**Granular Compared to Monolithic Fly Ash Leaching**

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**Abstract**

The European diffusion test EA NEN 7375 (EA) for determining the leaching of inorganic components for monolithic materials is cumbersome and time consuming.

The methods used in Israel for the same purpose consider the fly ash as a granular material. The test procedures used in Israel are the American Toxicity Characteristic Leaching Procedure (TCLP 1311), in which the leaching phase used is a buffered solution, and the European procedure EN 12457-2 (EN), with deionized water as the leaching phase.

Fly ash in embankments or disposal sites behaves probably more as a monolith rather than as a fine granular material. Therefore the leaching test should relate to the fly ash as a monolithic material. The leaching characteristics of monolithic waste material EA is not a short or simple test, so we tried to find correlation between the leaching results of the two tests (EA and EN). If there is such a correlation, it will be possible to make use of the simpler EN test.

As mentioned above, we compared between the EN method in which the leaching phase is water $L/S = 10$, to the monolithic EA method in which the $L/S$ ratio is 150 times the amount of water in liters per one square meter of monolith surface area.

Five fly ash samples of different sources where chosen, in duplicate, for the correlation test. Two of the monolith samples (the two duplicate) collapsed during the EA test, as happened to one of the pair of a third sample. So only three fly ash samples (two in duplicate and one single) survived for correlation.

The correlation was evaluated by dividing the concentration of each chemical element in the leaching water of EN (ppb) by the concentration of the corresponding element in the extract of EN (mg/m$^2$).

The amount of each element leached from the monoliths does not exceed the amount of 50 mg per square meter of the monolith surface area, with boron as an exception. Boron reaches a value of about 500 mg per square meter surface area. We have to remember that boron is an easy extractable element and almost 100% of this element is extracted by the EN method.
As for the correlation, two of the duplicate samples demonstrate similar values whereas the third sample is different.

More tests are required for reaching a conclusion.