

# Field Leaching of Bricks and Concrete Containing Coal Fly Ash

**Ruud Meij , Esther Kokmeijer, Leendert Tamboer and Henk te Winkel**

KEMA Power Generation & Sustainables, P.O. Box 9035, NL 6800 ET Arnhem, the Netherlands, telephone +31-26-3562225, fax +31-26-4453659, e-mail: r.meij@kema.nl

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## ABSTRACT

In the Netherlands building materials must comply with leaching limits as laid down in the Buildings Materials Decree. The leaching behaviour of the building materials has to be determined by standardised tests at the laboratory. The results of these tests are used as input in formulas that calculate the cumulative emissions over 100 years. The question arises whether this approach is a good prediction of what will happen in the field. At KEMA a major research item is to investigate leaching behaviour under field conditions. This paper presents the results of field leaching of two types of bricks for five and a half years and of concrete for two years. For these three types of building material two forms are tested, one ordinary form and one in which 20% coal fly ash (CFA) is used. The results are compared between the different types of clay, between materials with and without CFA and between prolonged field tests and brief laboratory leaching tests.

The use of CFA as a raw material in bricks and concrete increases the leaching of As, Mo and sulphate. Vanadium also shows this increase of leaching in bricks, but not in concrete. The effect of using CFA in one type of brick is that the Cr leaching increases, while in another type of brick and in concrete it decreases. In all cases and for all elements the leaching stays well below the limits as laid down in the Building Materials Decree, so CFA can well be used in building materials without contaminating the soil or surface water.

Compared to the 5½ years field test, the extrapolation of the diffusion test to 5½ years gives a reasonable prediction of the leaching of molybdenum and vanadium; however, the diffusion test overestimates the leaching of arsenic and barium and it underestimates the leaching of chromium and sulphate.