

The chromium (VI) legislation for cement

European test method for chromium (VI) content of cement

Introduction

Since 17 January 2005, an amendment to the UK's COSHH regulations (implementing EU Directive 2003/53/EC) has restricted the marketing/supply and use of cement and cement-containing preparations, where they contain when hydrated, more than 0.0002 % (2 ppm) chromium (VI) by dry weight of cement. In order to be able to quantitatively determine the chromium (VI) content of cement, the directive requires that the European Commission establish a test method but recommends that its development be carried out by CEN, the European Committee for Standardisation. Work began in CEN in late 2002 and is still underway.

Background to development of the European test method for chromium (VI) content of cement

CEN draft method, prEN 196-10, *Determination of the water-soluble chromium (VI) content of cement*, is based on an amalgamation of a modified version of the current Danish Standard DS 1020 and a mortar-based extraction procedure developed by ATILH, the French cement industry association. During development, careful consideration was given to: the principles of the German TRGS 613 regulatory method, the British Cement Association's 'inherent colour' method, the European method for cement-based adhesives being drafted by CEN/TC193/WG1 and the final draft of CEN/TR 14589 developed in CEN/TC292. In addition, a number of technical issues were resolved by reference to the USA Portland Cement Association's, R&D report Serial No. 2554 *Review and evaluation of analytical methods for the determination of hexavalent chromium in hydraulic cements and clinker* by Waldemar A. Klemm.

Status and principles of the draft European test method prEN 196-10

This European method is currently in draft form and passed the Formal Vote stage in April 2006. Its principles have been accepted by the EU Commission and it was referenced in the *Official Journal of the European Union* in January 2005. In principle, the method comprises three stages, test specimen preparation, extraction procedure and analysis of the filtered extract. A test portion of cement is used to make a standard mortar with CEN Standard sand and water in accordance with current standard BS EN 196-1. The mortar is mixed for a specified time and then filtered. An aliquot of filtrate is first treated with s-diphenylcarbazide reagent and then acidified within a narrow range of pH (2.1 to 2.5). In acid solution, chromium (VI) forms a red-violet complex with the reagent and its absorption/colour is measured using a visible light spectrophotometer set at a wavelength of 540 nanometres although other instrumental/end-point procedures are permitted. The content of water-soluble chromium (VI) is determined from a calibration curve and is expressed to the nearest 0.00001 %.

Can the method be modified for use with cement-containing preparations/formulations?

The draft method includes an informative annex B, Application of this European Standard to the determination of the water soluble chromium (VI) content of cement-containing preparations, which provides guidance on how the method may be modified. Possible modifications to each of the practical stages are described and the reporting stage outlined. Results need to be reported in % by mass of the dry cement content of the preparation and this, in turn, requires the cement content to be either 'known', determined or declared. The analyst is advised to contact the producer for further information about cement content. For a description of the content and purpose of informative annex A in prEN 196-10, see Fact Sheet 10.7 in this series.

Health and safety

Reducing agents, used to lower soluble chromium (VI) content of cements, do not make cement safe to handle without PPE. Cement, when wet, can cause two types of dermatitis, *allergic* and *irritant*. Reducing agents only protect against allergic dermatitis. The same PPE is, therefore, required for handling wet cement now that reducing agents have been introduced as was previously required.

Irrespective of the introduction of reducing agents, correct PPE would ensure users do not suffer allergic dermatitis, irritant dermatitis or burns.

Where can I find out more?

For product-specific information, contact your supplier/manufacturer directly. For generic information, contact: M G Taylor at BCA, Tel: 01276 608716, mtaylor@bca.org.uk

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