

Information Paper

Alkali-activated binders for precast and ready-mixed concrete products

A route map to standardisation, certification and guidance

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Approximately 5% of the global carbon dioxide (CO₂) emissions caused by humans currently arise from cement production. As a consequence, there is commercial interest in developing low-carbon cements and related binders suitable for use 'at scale' in concrete production. One variety of these is known as 'alkali-activated binders' or 'AA binders'. Alkali-activated binders and concretes produce less CO₂ in their manufacture than conventional Portland cement (PC) and they thus offer potential as one of several mainstream alternatives to PC. There is a clear need for (and some progress towards) standardisation and certification of AA binders and concretes. However, there are a range of possible routes and approaches open to the binder manufacturers. As is already the case with established Portland-based cements, supporting guidance, experience in use and codes of practice will ultimately be essential to underpin the wider acceptance of AA binders as a construction material.

This Information Paper summarises the current position in this emerging area of construction technology from a UK perspective. It draws on BRE's expertise and provides essential support for those likely to be involved in developing, adopting and utilising these binders commercially. This publication is intended to inform purchasers and specifiers of concrete and concrete products and those with a wider interest in the procurement of sustainable construction products.

Codes, standards, specifications and guidance for cement and concrete

Cement and concrete standards: the global context

The global application of concrete and most of the world's cement and concrete standards are underpinned by two standards – those of the European Union (BS EN 197)^[1, 2] and



Figure 1: Essentially, all the main cement-consuming markets in the world derive their 'rules' from two standards that are based around Portland cements

the United States (ASTM C150/C595/C1157)^[3, 4, 5], both of which are based around PC. In recent years, with the shifting focus of standards towards a performance basis and away from prescription, the door has begun to open to binders that have lower embodied carbon and do not rely on PC. Alkali-activated binders are one example.