

Global Cement and Concrete Association

GCCA Policy Document on Performance-Based Standards for Cement and Concrete

Version 1, October 2025

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Background

The GCCA Net Zero Roadmap¹ describes in detail the decarbonisation levers needed to achieve net zero by 2050. The industry, however, cannot deliver alone and requires the collaboration of built environment stakeholders and policymakers. According to the roadmap, savings in cement (and binders) will contribute 9% of emission reduction in 2050. In addition, the roadmap forecast that 5% of Portland clinker will be replaced by non-Portland clinker cements by 2050. A shift towards more performance-based standards rather than prescriptive will better facilitate those savings.

Introduction

Today's codes and standards do include some performance-based approaches, notably strength and workability, but current standards are largely prescriptive, that is, they state what materials to use, in what proportions, and under what conditions. Such examples are specified chemical and mineral compositions of cement and clinker and, in the case of concrete, minimum cement content and maximum water-to-cement ratios. While these rules provide certainty, they also create barriers to innovation and new low-carbon solutions.

Performance-based standards can help change this. Instead of prescribing the recipe, they define the performance requirements such as workability, strength, durability and safety. This opens doors to optimised cement content, alternative binders, and innovative material combinations that can reduce carbon emissions.

Performance-based approaches offer both opportunities and challenges. On one hand, they provide greater flexibility to optimise designs for specific applications and conditions. On the other hand, performance-based approaches require robust test methods and clear acceptance criteria. These challenges have been worked on for many years and this needs acceleration. Clients and their project teams need confidence that a concrete mix will perform over its design life without compromising safety. This approach demands closer collaboration between engineers, concrete producers, and testing laboratories since performance verification will become crucial.

While today's codes and standards do include some performance-based approaches² they still offer limited flexibility for the adoption of new low-carbon cement and concrete products. Changing these codes and standards in many cases requires significant time and consensus amongst all stakeholders involved. As new materials emerge, performance-based approaches provide the flexibility needed to innovate while maintaining the safety and durability that concrete construction demands.

¹Global Cement and Concrete Association. (2021) The GCCA 2050 Cement and Concrete Industry Roadmap for Net Zero Concrete. <https://gccassociation.org/concretefuture/wp-content/uploads/2022/10/GCCA-Concrete-Future-Roadmap-Document-AW-2022.pdf>

²Global Cement and Concrete Association. GCCA Pathways to more flexibility in standards: Performance based Approaches. November 2025.

Position Statement

GCCA recognises that a shift towards more performance-based standards will better facilitate carbon emission savings but that complete freedom in standards carries risks and therefore GCCA recommends an evolutionary path towards more flexibility through increasing performance-based approaches.

As a first stage, usage of well-tried and proven constituents should be expanded outside the ranges currently defined in "prescriptive" standards.

At a later stage, performance-based approaches should allow the qualification of new, alternative cementitious materials which beyond usual performance testing should also encompass other aspects such as environmental impact, leaching and health and safety.

Further details and explanation are provided in "GCCA pathway to more flexibility in standards: Performance Based Standards"².

Finally, all associated material and building documents - codes, standards and specifications – need appropriate drafting to ensure implementation of new performance-based approaches.

Policy recommendations ^{2, 3}

1. Establish government funding programmes for development and application of test methods to enable more performance-based approaches.
2. Ensure necessary support and resourcing for timely review, approval and publication of standards to ensure latest standards are available.
3. Ensure cement, concrete, design and construction codes and standards, and building regulations where applicable, are aligned and congruent. For example, construction codes must refer and default to latest available material standards.

GCCA Commitments ^{2, 3}

GCCA and its members commit to:

1. Actively engage and work with stakeholders in the value chain and especially standardisation bodies to achieve more flexibility in cement /concrete compositions whilst maintaining the essential characteristics of concrete, especially safety and durability.
2. Research activity to provide the evidence to amend standards and increase performance-based approaches.

³ Global Cement and Concrete Association. GCCA Policy Document on Blended Cements and Supplementary Cementitious Materials. 2024 https://gccassociation.org/wp-content/uploads/2025/07/GCCA_Blended_Cements_and_SCM_Policy_Document_Digital.pdf

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