AS 3582.4:2022

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Supplementary cementitious materials

Part 4: Pozzolans — Manufactured

AS 3582.4:2022

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The following are represented on Committee BD-031:

Amorphous Silica Association of Australia
Ash Development Association of Australia
Australasian (iron & steel) Slag Association
Australasian Pozzolan Association
Austroads
Cement Concrete & Aggregates Australia — Cement
Concrete Institute of Australia
Concrete Pipe Association of Australasia
Engineers Australia
National Precast Concrete Association Australia
University of New South Wales
University of Technology Sydney

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Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee BD-031, Supplementary Cementitious Materials, and is complementary to the existing series AS 3582 Part 1: *Fly ash*, Part 2: *Slag — Ground granulated blast-furnace* and Part 3: *Amorphous silica*. This Standard uses a similar structure.

The objective of this Standard is to set out the requirements for manufactured pozzolans for use as a supplementary cementitious material in concrete, mortar and related applications.

The primary aim of this document is to provide requirements for classes of manufactured pozzolans from various non-metallurgical and mineral processing industries which are not accommodated within existing Standards. This document has been developed to align with AS 3582 series, AS 1379 and AS 3972 and should be read in conjunction with relevant Standards.

The term 'informative' has been used in this Standard to define the application of the appendices to which it applies. An 'informative' appendix is only for information and guidance.

Notes used in this Standard are of an advisory nature only and are used to give explanation or guidance to the user on recommended considerations or technical procedures, or to provide an informative cross-reference to other documents or publications. Notes to clauses in this Standard do not form a mandatory part for conformance with this Standard.

This document includes commentary on selected clauses of the Standard. The commentary that directly follows the relevant clause is designated by 'C' preceding the clause number and is printed in italics in a box. The commentary is for information and guidance and does not form part of the Standard.

Contents

Introduction

Pozzolans include a broad category of materials, both naturally occurring, processed natural materials, and by-products of various manufacturing processes. All can be generally defined as being mainly siliceous or silico-aluminous or dicalcium silicates material that will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds having cementitious properties.

While natural pozzolan sources are well understood, there is an emerging class of manufactured pozzolans, which are the focus of this Standard. Manufactured pozzolans arise from various non-metallurgical and mineral processing industries which warrants greater attention given 'Circular Economy' drivers to maximize the use of by-products from mineral processing.

For example, an emerging class of manufactured pozzolan is lithium aluminosilicate by-products of Delithiated Beta Spodumene (DBS) from lithium bearing ores. Other examples of manufactured pozzolans include, but are not limited to, ferronickel slags, nickel slags, copper slags, beneficiated or reprocessed coal combustion products, processed waste glass, calcined clay and incinerator ashes from Waste to Energy (WtE).

The development of this new Standard, being part of the AS(/NZS) 3582 series, was supported by the stakeholders as an important first step to establishing requirements for manufactured pozzolans for use as a supplementary cementitious material in concrete, mortar and related applications.

During the planning phases a scope of work was defined related to the following main areas:

(a) Scope of standard to include cementitious, concrete and non-concrete related uses.

(b) Definitions.

(c) Classes of materials.

(d) Material requirements.

(e) Performance requirements.

(f) Test methods appropriateness and/or confirm new test methods.

(g) Comparison to existing standards to ensure the validity of the content and applicability.

(h) Reported properties.

(i) Where appropriate, referencing to existing standards.

Other objectives in creating this Standard relate to encouraging resource efficiency, that is, to facilitate the beneficial use of manufactured pozzolans as mineral resources within a modern circular economy, using well-defined standards to provide market confidence in the resource use.

Planning phases included extensive consultation being undertaken with existing stakeholders through the Australasian Pozzolan Association before submitting the project proposal. Consultation encompassed the whole supply chain of manufacturers, suppliers, users and academics with interest in these materials through their respective industry associations, but not limited to, the Australasian Pozzolan Association, Ash Development Association of Australia, Australasian (iron and steel) Slag Association, Amorphous Silica Association of Australia and Cement Concrete and Aggregates Australia.

The standard development process considered, where appropriate, existing international, national and relevant standards, coupled with publicly published documents and supporting information.

In summary, the new Standard includes new classes of materials, definitions, sources, specified requirements, testing methods and product conformity requirements in the normative section.

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Section 1 Scope and general

1.1 Scope

This Standard sets out requirements for manufactured pozzolans for use as a supplementary cementitious material in concrete, mortar and related applications.

> ***C1.1*** *Manufactured pozzolans may be suitable for use in other applications, for example, alkali-activated materials (e.g. geopolymer concrete) and soil stabilization.*

1.2 Application

This Standard sets out minimum requirements for manufactured pozzolans, but it may be necessary to supplement with related industry specifications as required.

1.3 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document:

NOTE Documents for informative purposes are listed in the Bibliography.

AS 2350.2, *Methods of testing Portland, blended and masonry cements, Method 2: Chemical composition*

AS 2350.9, *Methods of testing Portland, blended and masonry cements, Method 9: Determination of residue on the 45 um sieve*

AS 3583.1, *Methods of test for supplementary cementitious materials, Method 1: Determination of fineness by the 45 um sieve*

AS 3583.2, *Methods of test for supplementary cementitious materials, Method 2: Determination of moisture content*

AS 3583.3, *Methods of test for supplementary cementitious materials, Method 3: Determination of loss on ignition*

AS 3583.5, *Methods of test for supplementary cementitious materials Method 5: Determination of relative density*

AS 3583.6, *Methods of test for supplementary cementitious materials, Method 6: Determination of relative water requirement and strength index*

AS 3583.8, *Methods of test for supplementary cementitious materials, Method 8: Determination of sulfuric anhydride content*

AS 3583.12, *Methods of test for supplementary cementitious materials, Method 12: Determination of available alkali*

AS 3583.13, *Methods of test for supplementary cementitious materials, Method 13: Determination of chloride ion content*

AS/NZS 2350.1, *Methods of testing Portland, blended and masonry cements, Method 1: Sampling*