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Design of post-installed and cast-in fastenings in concrete

AS 5216:2021

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Preface

This Standard was prepared by the Standards Australia Committee ME-029, Fasteners, to supersede AS 5216:2018, *Design of post-installed and cast-in fastenings in concrete.*

The objective of this document is to provide minimum design requirements for fastenings used to transmit loads to concrete for safety-critical applications.

Standards Australia acknowledges and thanks the European Committee for Standardization—CEN, Rue de la Science 23, B-1040 Brussels, Belgium for permission to reproduce its content in the development of this document.

Standards Australia thanks the ICC Evaluation Service for permission to reproduce Clause 4.3.3.2.1, equations in Figure 4.3.3.2.1.2(A) and (B) and equations in Figure 4.3.3.2.2.2 from AC232:2019, *Anchor Channels in Concrete Elements*. These text and equations are copyright of ICC-ES. All rights reserved.

The major changes in this edition are as follows:

(a) Design of fasteners for seismic actions.

(b) Design of anchor channels.

(c) Design of redundant non-structural systems.

(d) Design of post-installed reinforcing bar connections.

The terms "normative" and "informative" are used in Standards to define the application of the appendices to which they apply. A "normative" appendix is an integral part of a Standard, whereas an "informative" appendix is only for information and guidance.

This document includes a commentary on some of the clauses. The commentary 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 document.

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Section 1 Scope and general

1.1 Scope and application

1.1.1 Scope

This document specifies minimum requirements for the design of fastenings used to transmit loads to concrete for safety-critical applications.

The fasteners covered in this document are as follows:

(a) Post-installed fasteners:

(i) Mechanical fasteners (e.g. expansion fasteners, undercut fasteners and concrete screws).

(ii) Chemical fasteners (e.g. chemical fasteners, chemical expansion fasteners).

(b) Cast-in anchor channel with rigid connection (e.g. forged or welded) between the channel profile and anchor.

This document also includes requirements for the testing and assessment of post-installed and cast-in fasteners to establish the necessary design parameters for use with this document.

The design provisions in this document are relevant to static, quasi-static and seismic loading that may include tension, shear, bending or torsion moments or a combination thereof.

The design provisions in this document do not apply to the following:

(i) Design of fixtures.

(ii) Design of fastenings for exposure to fire and durability.

(iii) Design of anchor channel for seismic actions.

(iv) Fasteners for lifting, transport and erection (e.g. brace inserts, lifting inserts, etc.), headed fasteners, ferrules, headed reinforcement and anchorage for prestressing strands.

NOTE For design actions, fastener products, substrates and applications not covered by the scope of this document, the design engineer should seek technical advice from the fastener supplier in relation to the suitability of the selected fastener for the intended application.

C1.1.1 *The design theory for fastenings embodied in this document utilizes the tensile strength of concrete and is closely based on the design procedure published in EN 1992-4.*

The design and installation provisions of this document have been developed on the assumption that materials used and their maintenance ensure that the installed fasteners will fulfil their intended function for the intended life of the structure.

1.1.2 Application

This document relies upon design parameters and product specifications that define a fastener's suitability for a given application. The testing and assessment of a fastener shall be performed in accordance with the requirements of Appendix A. All necessary design parameters such as characteristic values and product specifications such as geometric and material properties required for