PAS 670:2021

Magnesium oxide-based boards for use in buildings – Specification

Magnesium Oxide Building Board Trading Association

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Foreword

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The provisions of this PAS are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

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Introduction

Magnesium oxide building boards are a generic group of building boards widely used in construction industries throughout the world. This PAS is applicable only to boards manufactured from magnesium oxychloride or magnesium oxysulfate. Combined, these two types of boards account for over 99% of magnesium oxide boards used in the UK. Other formulations of boards are **not** covered by this PAS.

Magnesium oxide boards have been used in construction for over twenty years. Typically, they are used as a component in a building. They are generally selected for their strength to weight ratio, structural strength, performance when exposed to fire and workability.

However, concerns have been reported, most notably in Denmark in 2015, and also in Australia, where a reaction between boards and water vapour in the air (humidity) led to rapid degradation of the boards which also damaged adjacent components of the building(s).

This served to highlight that no common standard existed for the selection, testing and verification of the consistency of boards.

This PAS provides consensus-based best practice on how to select, test and verify the performance of magnesium oxide boards for use in construction. This is achieved using appropriate pre-existing standards for strength and durability testing, reaction to fire, testing requirements specific to the performance of these boards in a humid environment, and governance of the manufacturing, supply chains and traceability of boards.

Other standards for magnesium oxide boards are being developed by ASTM International[1)] and this work might inform a future revision of this PAS.

This PAS specifies the verification of the consistency of the manufacturing process and the testing of magnesium oxide-based boards for use in construction with reference to the following two standards:

- BS EN 12467:2012+A2, *Fibre–cement flat sheets – Product specification and test methods*, originally intended for fibre-cement flat sheets which have much in common with magnesium oxide boards, so much of the standard is highly relevant to these boards; and
- BS EN 13501-1, *Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests* – reaction to fire is a key attribute of magnesium oxide boards, so the fire classification requirements of this standard are referenced.

[1)] Details are available at https://www.astm.org/COMMIT/SUBCOMMIT/E0621.htm.

1 Scope

This PAS specifies requirements for flat sheet building boards manufactured using magnesium oxychloride or magnesium oxysulfate for the purpose of partitioning or internal and external lining of buildings, including the following characteristics:

a) dimensions and tolerances (see Clause **7**);
b) physical requirements and characteristics (see Clause **8**);
c) durability (see Clause **9**);
d) release of dangerous substances (see Clause **10**);
e) moisture movement (see Clause **11**);
f) reaction to fire (see Clause **12**);
g) performance in a humid environment (see Clause **13**);
h) verification of quality management system (QMS), factory production control (FPC) and consignment inspection (see Clause **14**); and
i) product traceability (see Clause **15**).

This PAS is intended for use by manufacturers, distributors and third-party verifiers, and sets out the requirements for how boards should be tested and verified as fit for purpose.

The PAS is not an installation guide.

The PAS is not applicable to the use of boards as flooring, sarking and roofing.

The PAS is not applicable to specific applications for which additional testing is required to demonstrate fitness for intended purpose, e.g. use of boards for racking resistance and as direct render substrates.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN 12467:2012+A2:2018, *Fibre-cement flat sheets Product specification and test methods*

BS EN 13501-1, *Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purpose of this PAS the following terms and definitions apply.

3.1.1 factory production control (FPC)

procedures in place to allow a manufacturer to maintain consistency in quality and to keep records of non-conforming products, processes or materials, in order to make improvements

3.1.2 quality management system (QMS)

system which implements the manufacturer/ distributor's policies and objectives into the processes that help maintain and improve a standard of quality

3.2 Abbreviated terms

For the purposes of this PAS, the following abbreviated terms apply.

MoE Modulus of elasticity measured in megapascals

MoR Modulus of rupture measured in megapascals