

Aggregates —

Part 4: Lightweight aggregates for concrete, mortar and grout — Guidance on the use of BS EN 13055-1

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- Association of Lightweight Aggregate Manufacturers
- British Precast Concrete Federation Limited
- British Vermiculite Association
- Concrete Society
- Department of Trade and Industry — Represented by Building Research Establishment Limited
- Institution of Structural Engineers
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- United Kingdom Quality Ash Association
- UK Steel
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Foreword

This Published Document has been prepared under the direction of Subcommittee B/502/5, Lightweight aggregates. It is one of nine parts that give guidance on the use and application of a series of European Standards for aggregates. These European Standards were prepared by CEN/TC 154, Aggregates, and have been adopted as British Standards. Conflicting British Standards relating to aggregates will be withdrawn at the latest by June 2004.

This part of PD 6682 gives guidance on the use of BS EN 13055-1 which specifies requirements for lightweight aggregates for concrete, mortar and grout. BS EN 13055-1 supersedes BS 3797:1990 which will be withdrawn in June 2004.

NOTE Users of BS 3797:1990 should contact BSI Customer Services for confirmation of withdrawal.

Attention is drawn to the fact that BS EN 13055-1 fully takes into account the requirements of the European Commission mandate M125, Aggregates, given under the EU Construction Products Directive (89/106/EEC) [1].

Guidance on the other European Standards in the series is given in the following parts of PD 6682.

- *Part 1: Aggregates for concrete — Guidance on the use of BS EN 12620.*
- *Part 2: Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas — Guidance on the use of BS EN 13043.*
- *Part 3: Aggregates for mortar — Guidance on the use of BS EN 13139.*
- *Part 5: Lightweight aggregates for bituminous mixtures and surface treatments and for unbound and bound applications excluding concrete, mortar and grout — Guidance on the use of BS EN 13055-2.¹⁾*
- *Part 6: Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction — Guidance on the use of BS EN 13242.*
- *Part 7: Armourstone — Guidance on the use of BS EN 13383 (all parts).*
- *Part 8: Aggregates for railway track ballast — Guidance on the use of BS EN 13450.*
- *Part 9: Guidance on the use of European test method standards.*

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

This Published Document is not to be regarded as a British Standard.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, an inside back cover and a back cover.

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¹⁾ Both BS EN 13055-2 and PD 6682-5 are in preparation.

Introduction

This document provides guidance on the use of BS EN 13055-1 which supersedes BS 3797:1990, the corresponding conflicting British Standard for lightweight aggregates for masonry units and structural concrete.

Compared to BS 3797, BS EN 13055-1 describes lightweight aggregates for the wider range of concrete, mortar and grout, describing them in a different manner and in some cases using different test methods to evaluate properties. Despite the wider field of application and different test methods there is no change to the essential character of lightweight aggregates in use in the UK.

BS 3797 specifies requirements for aggregates of pumice, expanded clay, shale and slate, clinker and furnace bottom ash and those based on pulverized fuel ash and blast-furnace slag. BS EN 13055-1 does not give such a prescriptive list of aggregates but instead defines lightweight aggregates in terms of an upper density limit. This means that perlite and vermiculite, which are not covered in BS 3797, fall within the scope of BS EN 13055-1.

BS EN 13055-1 specifies no limiting values other than requiring that lightweight aggregates have an upper particle density limit of $2\,000\text{ kg/m}^3$ or an upper loose bulk density limit of $1\,200\text{ kg/m}^3$. Tolerances for the declared values of both particle density and loose bulk density are specified in BS EN 13055-1:2002, 4.2.

Aggregate sizes in BS EN 13055-1 are described in a different manner to BS 3797. The prescriptive grading tables in BS 3797 have been replaced by a table of sieve sizes from which upper and lower sieve sizes can be selected to designate the aggregate supplied. The requirement in BS EN 13055-1:2002, 4.4 specifies that particle size distribution shall be determined and declared. This provides purchasers with the necessary information on the gradation of aggregate sizes not otherwise provided by the upper and lower sieve sizes. Tolerances for the declared values of aggregate size are specified in BS EN 13055-1:2002, 4.3.

Aggregate users should establish any limiting values of chemical properties appropriate to the application. The selection of a lightweight aggregate should be made by considering their combination with other constituents on the basis of values for specific chemical properties. Guidance on the effect of some chemical constituents of lightweight aggregates on the durability of concrete, mortar and grout is given in BS EN 13055-1:2002, Annex E. A procedure for converting chemical contents measured by mass to chemical contents by volume, to take account of the lower density of lightweight aggregates, is given in BS EN 13055-1:2002, Annex D.

BS EN 13055-1 includes recycled aggregates within its scope and indicates that their suitability should be assessed in accordance with the regulations valid in the place of use.

In response to the range of regulatory requirements for aggregates found in other CEN Member States, BS EN 13055-1 contains more requirements than BS 3797. BS EN 13055-1 is written in such a way that allows these additional requirements to be invoked only in those Member States where regulatory requirements exist, in addition to when they are appropriate to the end use of the aggregate.

BS EN 13055-1 includes three test methods as annexes. These are BS EN 13055-1:2002, Annex A, Annex B and Annex C. It is intended that these test methods will be published as separate European Standards when BS EN 13055-1 is revised. All other test methods specified in BS EN 13055-1 are described in separate European test method standards.

1 Scope

This part of PD 6682 gives guidance on the use of BS EN 13055-1 in the UK. BS EN 13055-1 which specifies the properties of lightweight aggregates and lightweight filler aggregates obtained by processing natural, manufactured, by-product or recycled materials and mixtures of these aggregates for use in concrete, mortar and grout in buildings, roads and civil engineering works.

BS EN 13055-1 covers lightweight aggregates of mineral origin having particle densities not exceeding $2\,000\text{ kg/m}^3$ (2.00 Mg/m^3) or loose bulk densities not exceeding $1\,200\text{ kg/m}^3$ (1.20 Mg/m^3), including:

- a) natural aggregates;
- b) aggregates manufactured from natural materials and/or from by-products of industrial processes;
- c) by-products of industrial processes;
- d) recycled aggregates.