



BSI Standards Publication

Code of practice for the design and installation of natural stone cladding and lining –

Part 4: Rainscreen and stone on metal frame cladding systems

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Summary of pages

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Foreword

Publishing information

This part of BS 8298 is published by BSI and came into effect on 31 December 2010. It was prepared by Technical Committee B/545, *Natural Stone*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

Together with BS 8298-1, BS 8298-2, BS 8298-3 and BS 8298-5¹⁾, this part of BS 8298 supersedes BS 8298:1994, which is withdrawn.

Relationship with other publications

BS 8298, *Code of practice for the design and installation of natural stone cladding and lining*, will be issued in five parts:

- *Part 1: General;*
- *Part 2: Traditional handset external cladding;*
- *Part 3: Stone-faced pre-cast concrete cladding systems;*
- *Part 4: Rainscreen and stone on metal frame cladding systems;*
- *Part 5: Internal linings.*¹⁾

Information about this document

This is a full revision of the standard, and introduces the following principal changes:

- BS 8298 has been completely restructured by splitting it into five parts;
- the BS 8298 parts have been updated to reflect general changes in the fixings systems available to support natural stone cladding panels.

BS 8298-1 contains the terms and definitions for all the parts of BS 8298.

Assessed capability. Users of this British Standard are advised to consider the desirability of quality system assessment and registration against the appropriate standard in the BS EN ISO 9000 series by an accredited third-party certification body.

Use of this document

As a code of practice, this part of BS 8298 takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this part of BS 8298 is expected to be able to justify any course of action that deviates from its recommendations.

¹⁾ In preparation.

Presentational conventions

The provisions of this standard 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.

Contractual and legal considerations

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

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This part of BS 8298 gives recommendations for the design and fixing of slabs of natural stone onto an intermediate metal framing system (which in turn is fixed to the building structure) as part of a ventilated rainscreen cladding system.

Recommendations are also given on the fixing of stone to metal framing systems as part of a non-ventilated rainscreen cladding system.

It covers:

- a) the provisions necessary for the cladding to perform its function satisfactorily;
- b) the materials and methods most frequently used for stonework;
- c) the use of thermal insulation behind external cladding.

It does not cover aggregate/agglomerated stone, roofing slate or terracotta panels used as external cladding.

This part of BS 8298 considers the use of stone cladding in all orientations, including vertical and sloping elements of the façade as well as soffit and coping panels. All methods of fixing are considered.

Recommendations for soft body impact testing are included, but not hard body.

This part of BS 8298 is to be read in conjunction with BS 8298-1.

Different cladding and lining methods are covered in the other parts of BS 8298 (see Foreword).

2 Normative references

The following referenced documents are indispensable for the application 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 648, *Schedule of weights of building materials*

BS 6093, *Design of joints and jointing in building construction – Guide*

BS 7671:2008, *Requirements for electrical installations – IEE Wiring Regulations – Seventeenth edition*

BS 8298-1:2010, *Code of practice for design and installation of natural stone cladding and lining – Part 1: General*

BS EN 1469, *Natural stone products – Slabs for cladding – Requirements*

BS EN 1991-1-1, *Eurocode 1 – Actions on structures – Part 1: General actions – Densities, self-weight, imposed loads for buildings*

BS EN 1991-1-3, *Eurocode 1 – Actions on structures – Part 1: General actions – Snow loads*

BS EN 1991-1-4, *Eurocode 1 – Actions on structures – Part 1: General actions – Wind actions*

BS EN 12153, *Curtain walling – Air permeability – Test method*

BS EN 12155, *Curtain walling – Watertightness – Laboratory test under static pressure*

BS EN 12600, *Glass in building – Pendulum test – Impact test method and classification for flat glass*

BS EN 13161, *Natural stone test methods – Determination of flexural strength under constant moment*²⁾

BS EN 14019, *Curtain walling – Impact resistance – Performance requirements*

BS EN ISO 6946, *Building components and building elements – Thermal resistance and thermal transmittance – Calculation method*

BS EN ISO 10211, *Thermal bridges in building construction – Heat flows and surface temperatures – Detailed calculations*

BS EN ISO 13788, *Hygrothermal performance of building components and building elements – Internal surface temperature to avoid critical surface humidity and interstitial condensation – Calculation methods*

BS EN ISO 13789, *Thermal performance of buildings – Transmission and ventilation heat transfer coefficients – Calculation method*

3 Terms and definitions

For the purposes of this part of BS 8298, the terms and definitions given in BS 8298-1 apply.

4 Exchange of information and time schedules

NOTE Guidance on the need for timely exchange of information and planning is given in BS 8298-1.

As a ventilated rainscreen cladding system is a high performance façade system, the necessary performance for the system should always be carefully specified by the project engineer.

5 Materials and components

5.1 General

NOTE 1 Guidance on the selection of materials is also given in BS 8298-1.

All materials and components should be used in accordance with the manufacturer's instructions.

NOTE 2 Failure to observe the manufacturer's instructions can invalidate any warranty that is offered on the complete wall system.

A ventilated rainscreen should have the following key elements:

- a) An outer layer (the rainscreen), intended to shelter the building from the majority of direct rainfall. Some joints between panels or at the edges of the rainscreen should be left open.
- b) A cavity, which can include insulation, intended to collect any water which passes through the joints in the rainscreen layer, and to permit such water to flow down to a point where it is collected and drained from the cavity. The insulation layer should not completely fill the cavity.
- c) A backing wall, intended to provide a barrier to air infiltration and water ingress into the building.

²⁾ This standard also gives an informative reference to BS EN 13161:2008.

NOTE 3 All of the joints in the rainscreen system do not need to be open. Joints in copings and sill panels will typically be sealed, as might joints in soffit panels. Vertical and horizontal joints on the face of the wall might be all open, or either the vertical or horizontal joints might be sealed. The most typical case, however, is for all of the joints on the face of the wall to be left open.

If open joints are to be used at low level, consideration should be given to the possibility of items being inserted into the joints by members of the public; rainscreen cladding might therefore not be appropriate at low level on publicly accessible buildings.

NOTE 4 A ventilated rainscreen cladding system is either pressure-equalized or drained-and-ventilated.

5.2 Pressure-equalized rainscreen cladding

For a rainscreen cladding system to be classed as pressure-equalized, the cavity behind the rainscreen panels should be subdivided into compartments so that:

- a) the width and height of each compartment is limited in size, depending upon its location on the building;
- b) the clear air gap behind the panels exceeds a minimum depth, which is dependent upon the design of the joints;
- c) only those joints that exceed a defined minimum width are classed as "open";
- d) the minimum free area of the "open" joints exceeds a certain proportion of the volume of the compartment; and
- e) provision is made to intercept water that drains down the cavity at suitable intervals, and to drain such water to the outside of the rainscreen layer.

5.3 Drained-and-ventilated rainscreen cladding

If the rainscreen cavity is not compartmented in accordance with the recommendations for a pressure-equalized system, it should only be classed as drained-and-ventilated provided that:

- a) the clear air gap behind the panels exceeds a minimum depth, which is dependent upon the design of the joints;
- b) only those joints which exceed a defined minimum width are classed as open;
- c) provision is made to intercept water which drains down the cavity at suitable intervals, and to drain such water to the outside of the rainscreen layer.

5.4 Rainscreen

5.4.1 General

NOTE The rainscreen panels shelter the remainder of the façade construction (the cavity and the backing wall) from direct wetting by rainfall. It is accepted that water might penetrate through the open joints, but steps can be taken to minimize this water ingress.