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Agrément Certificate
21/5958
Product Sheet 1

GEORGIA PACIFIC GYPSUM PRODUCTS

DENSGLASS SHEATHING BOARD

This Agrément Certificate Product Sheet(1) relates to DensGlass(2) Sheathing Board, for use as a non-loadbearing sheathing board on the external face of inner leaf walls of timber- and lightweight steel-frame constructions. The boards provide temporary weather protection prior to permanent weatherproof façade / rainscreen cladding.

(1) Hereinafter referred to as 'Certificate'.
(2) Registered trademark

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Strength and stability — the product can resist the wind actions and impact loads likely to be met in service (see section 6).

Performance in relation to fire — the product may achieve a reaction to fire classification of A1 in accordance with EN 13501-1 : 2007 (see section 7).

Water absorption — the product has a designation of GM-H1 in accordance with BS EN 15283-1 : 2008 (see section 10).

Durability — the product has acceptable durability and can be expected to have a service life equal to that of the building in which it is installed, provided that it is designed, installed and maintained in accordance with the requirements of this Certificate (see section 13).

The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

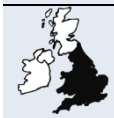
Date of First issue: 1 October 2021

Hardy Giesler
Chief Executive Officer

Certificate amended on 31 January 2022 to update Key Factors Assessed and section 13.

Regulations

In the opinion of the BBA, DensGlass Sheathing Board, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	**A1**	**Loading**
Comment:		The product can safely transmit horizontal forces to the primary structure. See section 6.3 of this Certificate.
Requirement:	**B3(4)**	**Internal fire spread (structure)**
Comment:		The product can contribute to a structure satisfying this Requirement. See section 7.1 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The product is acceptable. See section 13 and the *Installation* part of this Certificate.
Regulation:	**7(2)**	**Materials and workmanship**
Comment:		The product is unrestricted by this Regulation. See sections 7.1 and 7.3 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Durability, workmanship and fitness of materials**
Comment:		The use of this product satisfies the requirements of this Regulation. See sections 13 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	1.1(b)	Structure
Comment:		The product has sufficient strength to transmit horizontal design forces to the primary structure, in accordance with clauses 1.1.1(1), 1.1.2(2) and 1.1.3(1) of this Standard. See section 6.3 of this Certificate.
Standard:	2.4	Cavities
Comment:		The product can contribute to satisfying this Standard, with respect to clauses 2.4.1(1)(2) 2.4.2(1)(2). See section 7.1 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The product is unrestricted by this Standard, with reference to clauses 2.6.5(1) and 2.6.6(2). See sections 7.1 and 7.3 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The product can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	**12**	**Building standards applicable to conversions**
Comment:		Comments in relation to the product under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1(1)(2) and Schedule 6(1)(2).

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	**23(a)(i)**	**Fitness of materials and workmanship**
Comment:	**(iii)(b)(i)**	The product is acceptable. See section 13 and the *Installation* part of this Certificate.
Regulation:	**30**	**Stability**
Comment:		The product has sufficient strength to transmit horizontal forces to the primary structure. See section 6.3 of this Certificate.
Regulation:	**35(4)**	**Internal fire spread – structure**
Comment:		The product can contribute to a structure satisfying this Requirement. See section 7.1 of this Certificate.

Construction (Design and Management) Regulations 2015
Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 1 *Description* (1.1) and 3 *Delivery and site handling* (3.3 and 3.4) of this Certificate.

Additional Information

NHBC Standards 2021

In the opinion of the BBA, DensGlass Sheathing Boards, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Part 6 *Superstructure (excluding roofs)*, Chapter 6.2 *External timber framed walls* and Chapter 6.10 *Light steel framing.*

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard EN 15283-1 : 2008.

Technical Specification

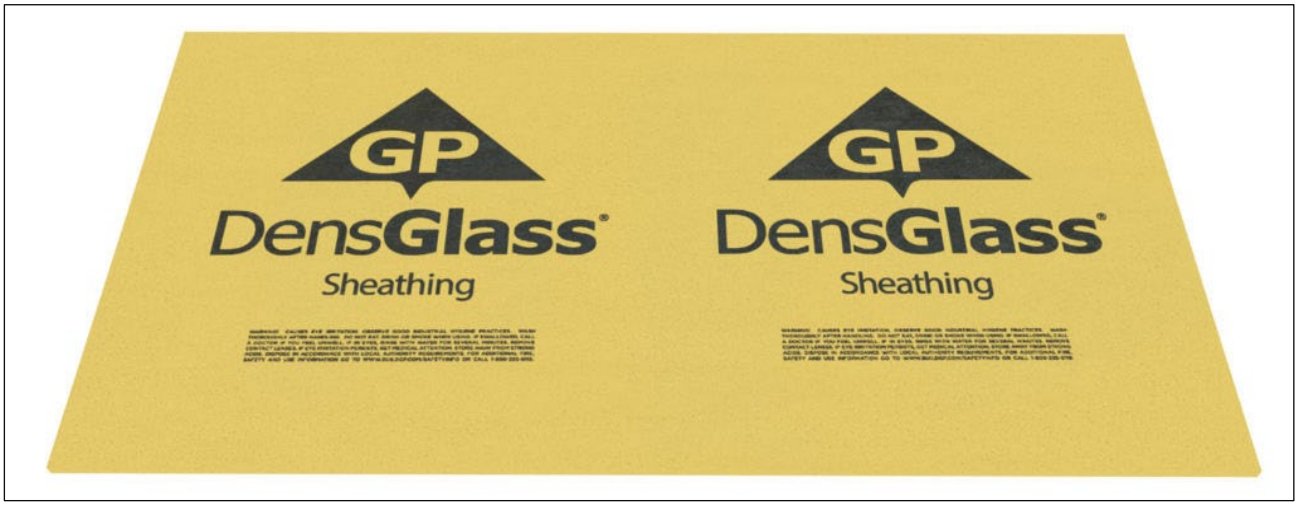
1 Description

1.1 The DensGlass Sheathing Boards (see Figure 1) comprise a glass fibre reinforced gypsum board with a gold-coloured glass fibre mat facing. The boards have the nominal characteristics:

Length (mm)	2400, 2700, 3000
Width (mm)	1200
Thickness (mm)	12.7, 15.9
Weight ($kg \cdot m^{-2}$)	9.27, 11.5
Mean density ($kg \cdot m^{-3}$)	725
Edge	square
Water vapour resistance (S_d in m)	0.1
Water vapour resistance factor (μ) (dry cup value)	5.12
Thermal conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	0.30
Flexural strength (N)	
longitudinal	843
transverse	631
Board designation to BS EN 15283-1	EN 15283-1 GM-H1 / 1200 / 2400 / 13 / SE

EN 15283-1 GM-H1 / 1200 / 2700 / 13 / SE
EN 15283-1 GM-H1 / 1200 / 3000 / 13 / SE
EN 15283-1 GM-H1 / 1200 / 2400 / 16 / SE
EN 15283-1 GM-H1 / 1200 / 2700 / 16 / SE
EN 15283-1 GM-H1 / 1200 / 3000 / 16 / SE.

Figure 1 DensGlass



1.2 Fixings for use with the boards are given in Table 1.

Table 1 Fixing type and dimensions

Fixing type	Material type	Coating	Dimensions	Fixing centres (mm)	Application
Self-drilling drywall screw	Carbon steel	Evoshield	Head diameter 9.2 mm Shank diameter 4.2 mm Length 32 mm	300	Heavier gauge steel frame (up to 2.5 mm)
Self-drilling cement board screw	Carbon steel	Evoshield	Head diameter 10 mm Shank diameter 4.2 mm Length 32 mm	300	Timber / steel frame
Undercutting drywall screw(1)	Carbon steel	Phosphate	Head diameter 8.0 mm Shank diameter 3.9 mm Length 35 mm	300	Timber frame
Collated drywall fine thread screw	Carbon steel	Evoshield	Head diameter 9.2 mm Shank diameter 3.9 mm Length 45 mm	300	Timber frame
Countersunk head screw	Carbon steel	Evoshield (metallic silver-green)	Head diameter 10 mm Shank diameter 4.2 mm Length 32 mm	300	Steel frame
Countersunk head screw	Carbon steel	Evoshield	Head diameter 10 mm Shank diameter 4.2 mm Length 42 mm	300	Steel frame
S-DD01	Carbon steel	Zinc-plated	Head diameter 7 mm Shank diameter 3.5 mm Length 25 mm	300	Timber frame

(1) For use in sheltered exposure zones (as defined in BS 8104 : 1992) only.

1.3 Other components specified for use with the boards, but outside the scope of this Certificate, include:

- breather membranes
- glass mesh joint tape
- joint sealant.

2 Manufacture

2.1 The gypsum slurry is poured out onto a reinforced glass mat base with a second reinforced mat laid on top to form the board. Once hardened, the boards are cut and dried, prior to trimming and storage. The boards are manufactured to the specifications/requirements of BS EN 15283-1 : 2008.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

3 Delivery and site handling

3.1 The boards are delivered to site wrapped in plastic packaging. This packaging is intended to provide temporary protection from moisture during transit only and must be removed upon arrival at the site.

3.2 The boards must be kept dry and stored on a firm, flat and level surface. The boards must be supported on risers on a level platform and be fully protected from weather, direct sunlight exposure and condensation. If the boards are temporarily stored outside, they must be sufficiently supported off the ground and covered by a securely anchored polythene sheet or tarpaulin to protect them from dampness, weather, contamination and mechanical damage, eg from construction traffic.

3.3 Packs of boards should be stacked no higher than two pallets from the ground for safe handling on site. This can be increased to four pallets in warehousing, providing the floor loading is checked as being adequate.

3.4 Manual off-loading of the boards should be carried out with care to avoid unnecessary strain and injury.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on DensGlass Sheathing boards.

Design Considerations

4 Use

4.1 DensGlass Sheathing boards are satisfactory for use as a temporary weather-resistant, external, non-loadbearing sheathing on steel and timber framed buildings behind a drained and ventilated rainscreen cladding.

4.2 The boards are suitable for exposure during a typical construction period and must subsequently be over-clad with a permanent weatherproof façade. The design, installation and performance of the permanent façade are outside the scope of this Certificate.

4.3 All joints and edges must be adequately sealed to ensure protection against water ingress.

4.4 Any external finishes/cladding must be installed such that the cavity behind satisfies the minimum cavity width required by *NHBC Standards 2021*.

5 Practicability of installation

The boards are designed to be installed by a competent contractor experienced with these types of products.

6 Strength and stability

6.1 The contribution of the boards to the stability of the substrate wall is assumed to be negligible. The timber- or steel-frame without the boards, must be able to take the full wind actions and racking loads and be capable of sustaining the weight of the boards. The adequacy of the timber or steel frame is outside the scope of this Certificate and must be verified by a suitably qualified and experienced individual.

6.2 A suitably-qualified and experienced individual must check the design and method of installation of the boards.

6.3 The characteristic pull-through resistance per fixing depends on the proximity to the edge and is given in Table 2. Fixings should have a maximum vertical spacing of 300 mm, with the supporting battens having a maximum horizontal spacing of 600 mm, and a minimum edge distance of 9 mm.

Table 2 Characteristic pull-through resistance (kN)[1][2]

Position	Pull-through resistance (kN)
	DensGlass Sheathing board with 4.2 x 42 mm screws
Corner	0.059
Edge	0.103
Centre	0.127

(1) Values were obtained for 4.2 mm diameter self-drilling screws with a 9.5 mm diameter countersunk head drilled flush with the external face of the board. These values can be applied to the other fixings detailed in section 1.2 as the worst-case scenario.
(2) Characteristic values were determined in accordance with EN 1990 from values obtained through testing to EAD 090062-00-0404.

6.4 For evaluation of design wind actions, the designer should apply the partial factor for actions of 1.5, in accordance with the UK National Annex to BS EN 1990 : 2002, Table NA.A1.2(A) to the characteristic wind load determined in accordance with BS EN 1991-1-4 : 2005. Special consideration should be given to locations with high wind load pressure coefficients as additional fixings may be necessary.

6.5 The number of fixings (as specified in section 1.2) should be determined from the minimum of the pull-through resistance of the boards and on any fire resistance requirements as specified by the designer.

6.6 The designer must ensure the following:

- The number and spacing of chosen fixings are such that the total pull-through resistance of the installed boards provide adequate resistance to the calculated design wind actions
- The number and spacing of chosen fixings provide adequate pull-out resistance from the timber/steel-frame onto which the boards are fixed.

7 Performance in relation to fire

7.1 DensGlass Sheathing boards have a reaction to fire classification of A1[1] in accordance with BS EN 13501-1 : 2007 over any D-s2,d0 (or better) substrate with a minimum thickness of 10 mm and a minimum density of 475 kg·m^{-3} with a cavity of ≥ 40 mm.

(1) Fire report from Warringtonfire, reference 185630 Issue 2, dated 05 February 2010.

7.2 The classification in section 7.1 may not be achieved by other constructions incorporating the product and the performance of such constructions should be confirmed in accordance with the documents supporting the national Building Regulations.

7.3 The product as described in 7.1 is not subject to any restriction on building height or proximity to boundaries, when used in conjunction with frame and insulation materials which also satisfy requirements of the national Building Regulations with respect to reaction to fire classifications. See also sections 7.1 and 7.2 of this Certificate.

7.4 Where the product is incorporated in a wall construction where fire resistance is required by the documents supporting the national Building Regulations, the fire resistance should be confirmed by a suitably qualified and experienced individual or by a test from a suitably accredited laboratory.

7.5 Designers should refer to the relevant national Building Regulations and guidance for detailed conditions of use, particularly in respect of requirements for fire resistance, cavity barriers, fire stopping of services and combustibility limitations for other materials and components used in the overall wall construction, for example, thermal insulation and cladding.

7.6 Cavity barriers must not block essential ventilation and drainage pathways. Guidance on fire barriers can be found in BRE Report BR 135 : 2013.

8 Proximity of flues and appliances

When installing the boards in close proximity to certain flue pipes or heat-producing appliances, the relevant provisions of the national Building Regulations must be met.

9 Water impermeability

9.1 When tested for water impermeability in accordance with BS EN 12467 : 2012, the 12.7 mm thick product showed no signs of water penetration after the 24-hour test. No dampness or dripping on the undersides of the sample was noted, therefore the board satisfied the requirements for water impermeability of a Category A board in accordance with this Standard.

9.2 External walls must have suitable weather protection on the outside and a ventilated cavity must be provided. The product must be treated as a conventional sheathing board with regard to detailing and damp-proofing at openings, eaves and sole plates, and the fixing of wall ties. Where required by the design, the addition of a breather membrane must be in accordance with BS 5250 : 2021.

10 Water absorption

The water absorption of the boards is 2.99% when tested in accordance with BS EN 15283-1 : 2008 and therefore is designated as having reduced water absorption rate Type H1 in accordance with this Standard.

11 Condensation

11.1 When measured in accordance with EN ISO 12572 : 2016 at 23°C and 94/50% RH, the water vapour transmission rate of the boards was 254 $g \cdot m^{-2} \cdot day^{-1}$. This equates to a water vapour resistance of 0.336 $MN \cdot s \cdot g^{-1}$ and a water vapour resistance factor (μ) of 5.12.

11.2 When over-cladding, the overall design for control of moisture and the recommendations given in BS 5250 : 2021 must be considered.

12 Maintenance

12.1 As the boards have suitable durability (see section 13) and will always be confined behind the over cladding/façade, maintenance is not required.

12.2 Under normal conditions of use, the boards are unlikely to suffer damage, but if damage does occur any damaged boards and sealant must be replaced in accordance with this Certificate and observing all necessary health and safety requirements.

13 Durability

13.1 Under normal periods and conditions of wind, rain and heat exposure, the boards will provide temporary protection to the structure against the weather during a typical construction period of up to three months.

13.2 The durability and service life of the boards and the fixings will depend on the location, immediate environment and intended use of the building and on any damaged boards being replaced prior to over-cladding. Provided it is installed in accordance with the Certificate holder's instructions, the product can be expected to have a service life equal to that of the building in which it is installed, when used in the normal climatic conditions found in the UK.

13.3 The boards have been tested and are susceptible to algal growth. The product must therefore be installed with a ventilated and drained air cavity between the boards and the external cladding.

14 Reuse and recyclability

The boards are manufactured from gypsum, which can be recycled.

Installation

15 General

15.1 The DensGlass Sheathing boards must be installed in accordance with this Certificate and with the Certificate holder's instructions.

15.2 Reasonable precautions must be taken to ensure that panels are not damaged during installation and in service.

15.3 The lowest point of the boards must be kept above damp-proof course level.

16 Procedure

16.1 The boards can be attached parallel or perpendicular to timber or steel framing. The boards must be installed onto timber framing at least 38 mm wide and onto steel framing at least 32 mm wide. Framing members should not vary more than 3 mm from the plane of the faces of adjacent framing members.

16.2 Fixings should be driven flush with the board surface and into the framing system. Fixings should be at a minimum of 9 mm from the edges and corners of the boards. Supports should be at a maximum horizontal spacing of 600 mm and the fixings should have a maximum vertical spacing of 300 mm.

16.3 The boards should be installed with staggered joints and must be properly flashed at openings. Board joints and exposed edges should be sealed with joint tape or with sealant.

17 Repair

The completed installation must be inspected, and any damaged boards and sealant replaced.

18 Over-cladding/façade finish

Wall claddings must be fixed through the boards into the structural framing. The over-cladding or façade manufacturer must be consulted for fixing specifications. Any damaged or loose boards must be replaced or adequately fixed before fixing the façade.

Technical Investigations

19 Tests

Tests were carried out and the results assessed to determine:

- density
- dimensional stability
- flexural strength
- water absorption

- water vapour permeability
- resistance to algal growth
- pull-through resistance
- corrosion resistance of fixings.

20 Investigations

20.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

20.2 An assessment was made of test reports relating to the reaction to fire classification of the product to EN 13501-1 : 2007.

Bibliography

BS 5250 : 2021 *Management of moisture in buildings — Code of practice*

BS EN 1990 : 2002 + A1 : 2005 *Eurocode – Basis of structural design*
NA to BS EN 1990 : 2002 + A1 : 2005 UK National Annex for *Eurocode — Basis of structural design*

BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 – Actions on structures – General actions — Wind actions*
NA to BS EN 1991-1-4 : 2005 + A1 : 2010 UK National Annex to *Eurocode 1 – Actions on structures – General actions — Wind actions*

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

BS EN 13501-1 : 2007 *Fire classification of construction products and building elements — Classification using test data from reaction to fire test*

BS EN 15283-1 : 2008 + A1 : 2009 *Gypsum boards with fibrous reinforcement – Definitions, requirements and test methods – Gypsum boards with mat reinforcement*

BS 8104 : 1992 *Code of practice for assessing exposure of walls to wind-driven rain*

EN ISO 12572 : 2016 *Hygrothermal performance of building materials and products – Determination of water vapour transmission properties – Cup method*

BR 135 : 2013 *Fire performance of external thermal insulation for walls of multistorey buildings*

EAD 090062-00-0404 *Kits for external wall claddings mechanically fixed*

21 Conditions

21.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

21.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

21.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

21.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

21.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

21.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

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